SOIL SURVEY OF SIMCOE COUNTY

Report No. 29
of the Ontario Soil Survey

Ontario

Ministry of Agriculture and Food

David Ramsay, Minister

Agriculture Canada

Research Branch

Direction générale de la recherche

SOIL SURVEY
of
SIMCOE COUNTY
Ontario

by

D. W. HOFFMAN

R. E. WICKLUND

Soil Research Institute

and

N. R. RICHARDS

Ontario Agricultural College

GUELPH, ONTARIO

1962

(Reprinted January 1990)

★

REPORT NO. 29 OF THE ONTARIO SOIL SURVEY

Research Branch, Canada Department of Agriculture
and the Ontario Agricultural College

For other Counties and
Districts Survey Information,
Contact the
Consumer Information Centre,
Ontario Ministry of Agriculture and Food,
Main Floor,
801 Bay St.,
Toronto, Ontario
M7A 2B2

90-05297/2

TABLE OF CONTENTS

	Page
INTRODUCTION	8
GENERAL DESCRIPTION OF THE AREA	9
Location	9
Principal Towns	9
Population	9
Transportation	10
Geology of the Underlying Rocks	10
Surface Deposits	10
Vegetation	13
Climate	15
Relief	16
Drainage	18
	19
THE CLASSIFICATION AND DESCRIPTION OF THE SOILS	21
Series, Type and Phase	26
Soil Catena	26
Soil Key	27
Osprey Series	31
Vasey Series	32
Bondhead Series	33
Guerin Series	35
Lyons Series	36
Harriston Series	37
Harkaway Series	38
Wiarton Series	39
Parkhill Series	40
Otonabee Series	40
Vincent Series	41
Kemble Series	42
Dunedin Series	43
Tioga Series	43
Alliston Series	46
Granby Series	47
Caledon Series	48
Burford Series	49
Sargent Series	50
Gwillimbury Series	50
Gilford Series	51
Wyevale Series	51
Hendrie Series	52
Dundonald Series	52
Edenvale Series	53
Bookton Series	53
Berrien Series	54
Wauseon Series	55
Percy Series	55
Medonte Series	57
Lovering Series	57
Atherley Series	59
Schomberg Series	60
Smithfield Series	62
Simcoe Series	63

TABLE OF CONTENTS — Continued

	Page
Minesing Series	65
Bennington Series	66
Farmington Series	67
Muck	68
Bottom Land	70
Marsh	70
Eastport Series	70
Rock	70
Rock - Atherley clay complex	71
Atherley clay - Rock complex	71
Medonte silty clay loam - Rock complex	71
Smithfield silty clay loam - Berrien sandy loam complex	72
Simcoe silty clay loam - Berrien sandy loam complex	72
Parkhill loam - Edenvale sandy loam complex	72
Osprey loam - Dunedin clay complex	73
Wiarton loam - Edenvale sandy loam complex	73
Tioga loamy sand - Vasey sandy loam complex	74
Tioga loamy sand - Bondhead loam complex	75
Rock - Otonabee loam complex	76
AGRICULTURAL METHODS AND MANAGEMENT	77
Soil Management	78
Crop Ratings for Simcoe County Soils	84
APPENDIX	89
Profile Descriptions and Analytical Data	90
MAP — Soil Map of Simcoe County in pocket back of report.	

ILLUSTRATIONS

Figure		Page
1.	Outline Map of Ontario Showing Location of Simcoe County	6
2.	Outline Map Showing Townships and Principal Centres	7
3.	Outline Map Showing Bedrock Geology	11
4.	Outline Map Showing Distribution of Surface Deposits	12
5.	Outline Map Showing Drainage System	20

ACKNOWLEDGMENTS

The soil survey of Simcoe County was a co-operative project of the Canada Department of Agriculture and the Ontario Agricultural College. Mr. A. K. H. Rose assisted with the field mapping.

The authors wish to express their appreciation for the advice and assistance given by Dr. P. C. Stobbe, Director, Soils Research Institute, Central Experimental Farm, Ottawa.

Drafting of the soil map and analysis of the various soils were carried out at the Agricultural College and grateful acknowledgment is made of the help provided by the staff.

The soil map was prepared for lithographing by the Cartographic Section of the Soil Research Institute, Central Experimental Farm, Ottawa.

SOIL SURVEY MAPS and REPORTS

PUBLISHED BY COUNTIES

★

Norfolk	Map No. 1
Elgin	Map No. 2
Kent	Map No. 3
Haldimand	Map No. 4
Welland	Map No. 5
Middlesex	Map No. 6
Carleton	Report No. 7
Parts of Northwestern Ontario	Report No. 8
Durham	Report No. 9
Prince Edward	Report No. 10
Essex	Report No. 11
Grenville	Report No. 12
Huron	Report No. 13
Dundas	Report No. 14
Perth	Report No. 15
Grey	Report No. 16
Bruce	Report No. 17
Peel	Report No. 18
York	Report No. 19
Stormont	Report No. 20
New Liskeard - Englehart Area	Report No. 21
Lambton	Report No. 22
Ontario	Report No. 23
Glengarry	Report No. 24
Victoria	Report No. 25
Manitoulin	Report No. 26
Hastings	Report No. 27
Oxford	Report No. 28
Parry Sound	Report No. 31

Figure 1: Outline Map of Ontario Showing Location of Simcoe County

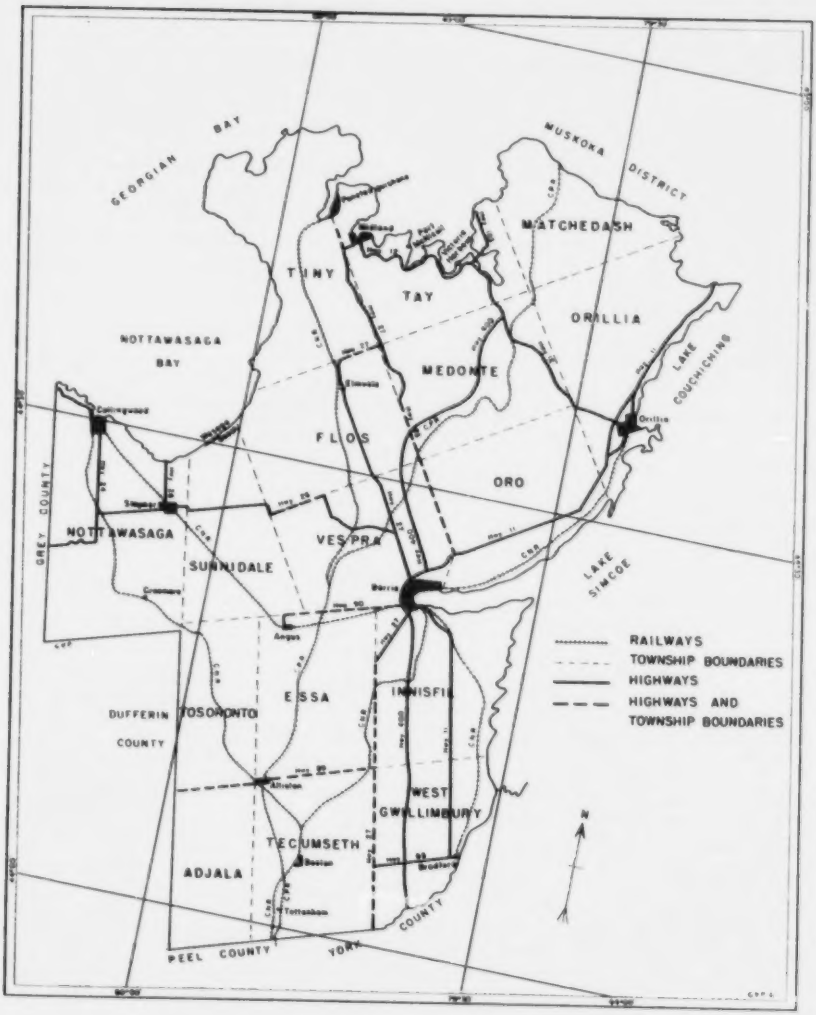


Figure 2: Outline Map Showing Townships, Principal Centres, etc.

Soil Survey Report of Simcoe County

by

D. W. HOFFMAN[1], R. E. WICKLUND[2] and N. R. RICHARDS[3]

INTRODUCTION

A survey of the soils of Simcoe County was made with the object of obtaining information about the soils occurring in the area. The soil map that was prepared showing the size and distribution of the various types of soils found accompanies this report.

The variations in soils occurring in this area are more numerous than those found in many other counties in Ontario. The relief varies from depressional to extremely hilly and, except for the more northerly parts of the County, the soil deposits are deep. Most of the soils in the area can be used for cultivation but nearly all require some treatment to improve their workability or fertility. Such improvements may consist of stone removal, fertilizer applications, installation of drains, irrigation or practices to reduce erosion.

The agricultural potential of this area in terms of soil use is great. Dairying and mixed farming are the most common types of farming. However, cash-crop farming is carried on in many districts. Tobacco is important in the Alliston and New Lowell districts and the growing of this crop is expanding rapidly to other regions in the County. Fruit and vegetables are grown in the Collingwood district and potatoes in other specified areas.

This report discusses the characteristics of the soils in regard to their formation, composition, capabilities and limitations in agricultural use. Each soil type is described in detail and its location can be identified on the soil map.

A section on soil management and a rating of the soils according to their suitability for various crops is included in the report. Much of this information is general, and is an attempt to present the principles of good soil management as they apply to all soils. Sources of additional information with regard to crops and fertilizer practices are listed for the interested reader.

1. Formerly Pedologist, Soil Research Institute; now Associate Professor Soil Science Department, Ontario Agricultural College.

2. Senior Pedologist, Soil Research Institute, Canada Department of Agriculture.

3. Professor and Head, Soil Science Department, Ontario Agricultural College.

GENERAL DESCRIPTION OF THE AREA

Location

Simcoe County is located in the northwestern part of South Central Ontario at approximately 44° latitude and 80° longitude. It is one of the largest counties in Southern Ontario.

The total land area is 1,064,320 acres (1,663 square miles) of which 759,400 acres or about 71 per cent is occupied farm land.

Principal Towns

There are seven incorporated towns in the County, two of which have more than 10,000 inhabitants. The largest town is Barrie, located on Kempenfelt Bay, with a population of 16,851*. It is the administrative centre for the County and one of the main shopping areas. The office of the Agricultural Representative for North Simcoe is located here and the town serves as one of the main markets for local agricultural products. Orillia (13,857) another of the larger population centres is well supplied with commercial and industrial firms. Its location on Lake Couchiching makes it a popular shopping centre for the many cottage and resort owners vacationing in the area. Collingwood (7,978), Midland (8,250) and Penetanguishene (5,420) are all located on Georgian Bay and are important ports. Collingwood is surrounded by a fruit and vegetable growing district and a large part of these crops are marketed here. It is also well known for its ship-building industry. The lakeshore near these three towns consists of great expanses of sand and the water is shallow and warm, hence, these towns constitute one of the most popular resort areas in Southern Ontario. Alliston (2,426) is located in the centre of a productive tobacco and potato growing district and is the headquarters for the Agricultural Representative for South Simcoe. Stayner (1,429), a well known agricultural centre, is among the smallest of the towns in Simcoe County. Beeton (675), Bradford (2,010), Coldwater (693), Creemore (838), Elmvale (897), Port McNicoll (932), Tottenham (702), Victoria Harbour (1,012) and Wasaga Beach (529) are incorporated villages in the County and serve as local market places. They also provide other important functions. For example, Port McNicoll and Victoria Harbour have good docking facilities for large boats, Wasaga Beach is a well known summer resort and Bradford is the distribution centre for the many vegetables grown on the Holland Marsh which adjoins it.

*Population figures from the Census of Canada, 1956.

Population

According to the 1956 Census the total population of the County is 127,016, which is an increase of almost 20 per cent since 1951. Approximately 53 per cent of the people were rural dwellers but only 20 per cent obtained an income from farming. Since 1951 the number of rural dwellers has increased from 57,540 to 66,682 — an increase of almost 16 per cent.

Transportation

Simcoe County is well supplied with roads. Highways 11, 24, 27, 93 and 400 run in a more or less north and south direction, providing outlets to the large Toronto market. East and west routes are provided by highways 12, 26, 88, 89 and 90. In addition, there are numerous county roads providing access to most parts of the County.

All of the towns have rail facilities. Midland, Orillia, Barrie, Collingwood and Penetanguishene are served by the Canadian National Railway and the transcontinental line of the Canadian Pacific passes through Alliston and the middle of the County. A certain amount of transportation by boat occurs from the ports of Collingwood, Port McNicoll, Penetanguishene and Midland.

Geology of the Underlying Rocks

The soils of Simcoe County are underlain by rocks of the Ordivician, Silurian and Precambrian ages which outcrop in many places in the more northerly parts of the County. Limestones of the Black River, Trenton, Medina, Cataract and Lockport formations and shales of the Utica, Queenston and Richmond formations are present.

As shown in Figure 3, the central part of the County is underlain by a belt of Trenton and Black River limestones that extends across the Province from Georgian Bay to Lake Ontario. The Black River limestones occupy a narrow strip along the northern edge of the main limestone belt where they are in contact with the Precambrian granitic rocks occurring in the northern part of the County. These Black River limestones commonly form a low escarpment and thus are in a favourable position for quarrying. The quarries at Medonte and Uhthoff, producing flux and crushed stone, are opened in the upper beds of this escarpment. Chert is abundant in this formation near Midland Bay but occurs infrequently from Medonte eastward.

The Trenton limestone underlies the greatest part of the County. This formation consists almost entirely of calcitic limestone and has a maximum thickness of 600 feet. It is dark grey to brownish grey in colour and silicified fossils and chert commonly occur within the limestone. The strata have a gentle dip to southwest, in which direction they are overlain by Utica shale, the transition from the limestone formation to the shale formation being very gradual.

The shales of the Utica formation are grey to dark bluish grey in colour and contain layers of calcareous sandstone and sandy shale. The strata are overlain by the brick red sandy and argillaceous shale of the Queenston formation which can be seen in exposures along the easterly side of the Niagara Escarpment.

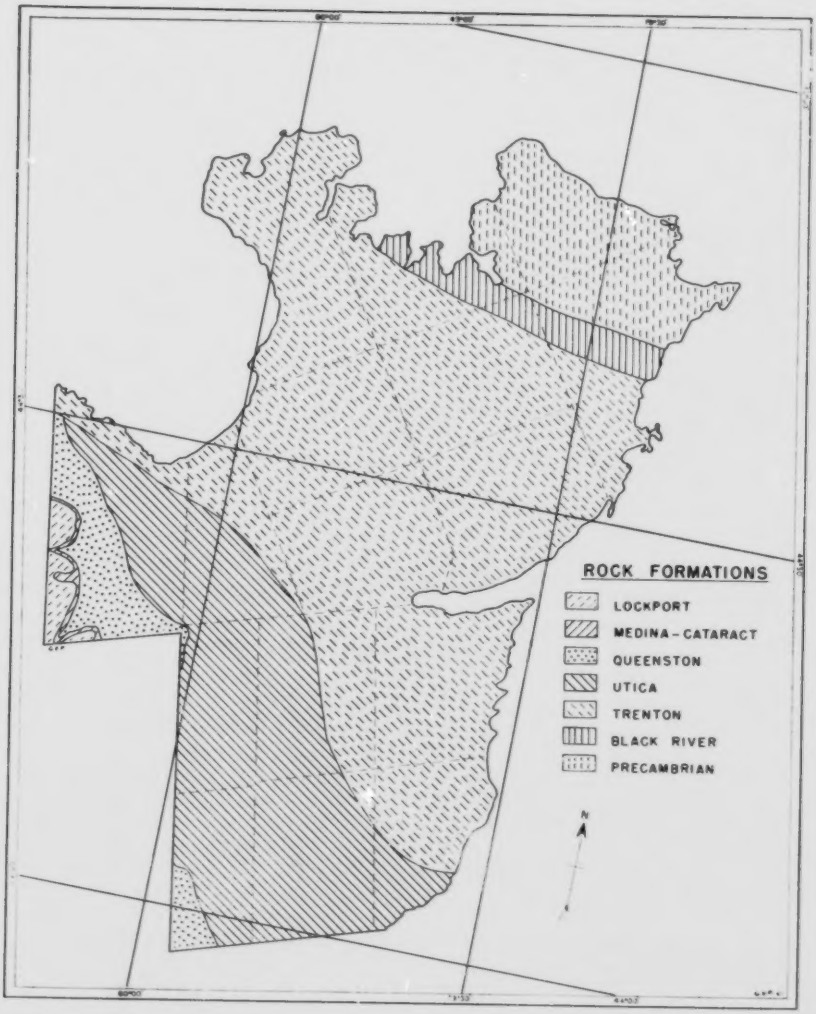


Figure 3: Outline Map Showing Bedrock Geology

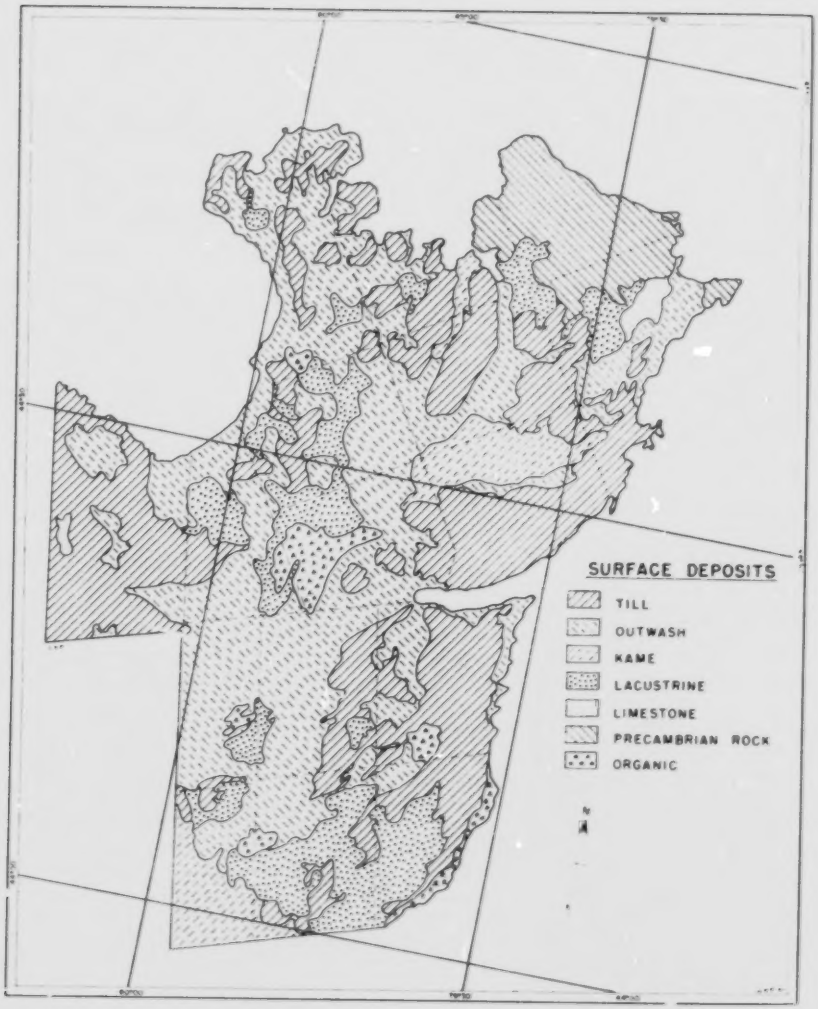


Figure 1: Outline Map Showing Distribution of Surface Deposits

The two shale formations are overlain by the Medina-Cataract formation. It consists of dark brown to dark bluish grey dolomitic limestone containing, on the average, about 7 per cent of impurities. This formation is followed by the Lockport formation which forms the brow of the Escarpment. The Lockport formation consists of magnesian limestone and dolomite, the dolomite being dominant in Simcoe County. The dolomite is grey to buff in colour with numerous silicified fossils.

Surface Deposits

The surface deposits in the Simcoe area are chiefly of glacial origin and they constitute the parent materials from which the soils have developed. The variations that occur in texture, relief and drainage of soils are a result of differences in the composition of these deposits.

The principal types of surface deposits are described in Table 1 and their distribution is shown in Figure 4.

The glacial till materials occur chiefly in the eastern side of the County extending from Bradford to a short distance north of Vasey and appear in the form of broad ridges separated by flat-floored valleys covered with silt, clay or sand. The till is generally coarse textured and consists of a mixture of boulders, cobbles, gravel, sand, silt and clay. It becomes more sandy and contains more Precambrian rock towards the north. These materials have formed loam and sandy loam soils with various degrees of stoniness and a topography which varies from gently rolling to hilly. The land form consists principally of ground moraine. However, several drumlins occur in the south and in the region of Orillia. Some large deposits of till also occur in the western part of the County, especially in Nottawasaga Township. These deposits contain somewhat more clay than those in the east and in some places have a clay loam texture. In addition, the till deposits near the Escarpment are very steep and very stony.

TABLE 1.

SURFACE DEPOSITS OCCURRING IN THE SIMCOE COUNTY MAP AREA

1. GLACIAL TILL:	
Ground Moraine	Generally unsorted material. Topography is characterized by a succession of low knolls and depressions. Textures are sandy loam to clay loam — contains stones and boulders.
Terminal Moraine	Often modified or resorted. Topography is rough to hilly. Textures range from sandy loam to clay loam — stonier than ground moraine.
Drumlin	Elongated hill lined in the direction of ice advance, usually unsorted. Textures sandy loam to clay loam. Contains stones and boulders.
2. GLACIO-FLUVIAL:	
Outwash Plain	Sandy and gravelly area occurring on a nearly level plain but may be marked by enclosed depressions and by incised ravines. Often cobbly but is usually boulder-free.
Kame	Short hill of sand and gravel — may contain resorted till. Contains some stones and boulders.
3. LACUSTRINE	Clays, silts and sands laid down in glacial lakes. Topography is usually very gently sloping, although moderately steep slopes are encountered in some areas. Stones are few to absent except in areas where thin lacustral deposits are underlain with till.
4. RECENT ALLUVIAL	Post-Glacial deposits of sands, silts and clays along streams, meadows, sloughs and marshes. Also includes mucks and peats. Soils are immature; topography is nearly level to depressional. Stones are rare.

Outwash deposits consist of sands and gravels sorted from glacial till by rapidly flowing glacial streams. During the process of sorting, the fast-flowing water removed most of the silt and clay and left a residue of sand, gravel, cobbles and boulders. These coarse textured materials were laid down by running water in land form patterns which are recognized as outwash plains, beaches and kames. The outwash plains occur as gravelly or sandy areas having gently sloping topography. Gravel bars are common

in the County, having been produced by various stages in the levels of Lake Algonquin. However, north of Barrie there are gravel streaks which appear to be shoreline deposits of water levels 200 feet or more above Lake Algonquin.

Gently undulating outwash sand plains cover a large part of the middle of the County extending from south of Alliston through Camp Borden to the Penetanguishene Peninsula. These plains are not continuous, but are broken by clay plains and till uplands. The sands of the County are coarse in texture with the exception of those of the Alliston district.

The kame deposits consisting of sand occur in the form of short, steep hills. In general these hills of sand are also associated with till deposits producing rough topography. Such sand hills are common in the south-western part of the County where they are a part of the Oak Ridges moraine. Other morainic sand hills occur in Oro Township which are similar to the Oak Ridges moraine in land form and texture but the materials of which they are composed are less calcareous.

The lacustrine deposits occupy the lower, flatter areas and represent the ancient bed of glacial Lake Algonquin. Most of the glacial lake deposits have regular, gently sloping topography, although some dissection by streams has produced an uneveness of the terrain. The texture of the lacustrine deposits varies from silt loam to clay. Most of these deposits are free of stones, particularly where they are thick. Where more than an occasional boulder is encountered, the lacustrine deposit is usually thin and the underlying till is close to the surface. Some stones and boulders may have been rafted into these lakes by ice.

In Simcoe County the main lacustrine deposits occur in the regions near Coldwater, Elmvale, Stayner, Minesing and Beeton. The deposits have a level to gently undulating topography in all areas except the one in the vicinity of Beeton. The deposit in the Beeton area is a part of the Schomberg clay plain and it overlies a drumlinized till plain. The smaller drumlins are completely buried but in the larger ones the clay occurs well up the slopes of the hills. Because the rolling relief of the underlying till plain has not been entirely erased and because of dissection by post-glacial streams, this area is not as flat as many lake plains.

The lacustrine deposits are calcareous in the south and central portions of the County but are non-calcareous in the more northerly districts.

Deposits of organic material occur throughout the County, the largest being the Holland Marsh and Minesing Swamp. They are the partly decayed remains of trees, shrubs and mosses and have been classified as muck.

Vegetation

The type of natural vegetation found in an area is influenced largely by climate and soil. Vegetation, in turn, exerts considerable influence on the development of a soil and therefore is an important factor in soil formation. The extent to which it influences soil development varies with the type of vegetation.

Since vegetation is one of several inter-related soil forming factors, it is very difficult to measure the exact effect that it has on the detailed profile features which are used to make soil type separations. A survey of the vegetation shows, in a general way, what tree associations most commonly occur on some of the more important soils.

Beech and sugar maple are the dominant trees in woodlots located on well drained soils

The most commonly occurring trees are sugar maple, red maple, elm, basswood, yellow birch, red and white oak, ironwood, beech, white and black ash, aspen, and white birch. Conifers are scattered throughout but in no great quantity, except in reforested areas, and consist of white and red pine, white spruce, balsam, fir, and hemlock.

Climate

There are five meteorological stations in Simcoe County located at Barrie, Beeton, Coldwater, Collingwood and Orillia. Climatic data is presented in Tables 2 and 3 from these stations and other selected points. Data from Kapuskasing are included to represent the northern coniferous region and that from Huntsville represents the transitional zone between hardwoods and conifers. Records from Brantford are included to represent the hardwood region in Southern Ontario.

TABLE 2.

TEMPERATURE AT BARRIE, COLLINGWOOD AND ORILLIA AND OTHER SELECTED POINTS

Month	Temperature in Degrees F					
	Barrie (45)*	Collingwood (24)*	Orillia (38)*	Brantford (51)*	Huntsville (30)*	Kapuskasing (14)*
December	24	25	21	26	19	6
January	18	20	17	22	14	-2
February	16	19	14	20	12	2
Winter	19	21	17	23	15	2
March	26	27	26	31	24	14
April	40	41	40	43	39	31
May	52	53	53	55	52	36
Spring	39	40	40	43	38	30
June	63	63	63	65	61	57
July	68	68	68	70	66	62
August	66	66	66	67	64	60
Summer	66	66	66	67	64	60
September	59	61	59	61	57	51
October	48	50	47	48	45	39
November	35	36	34	37	32	22
Fall	47	49	47	49	45	37
Annual	43	44	42	45	41	32
May 1 to October 1	62	62	62	64	60	55

*Years observed.

According to Table 2 the winters in the surveyed area are cold with a mean temperature of 17° to 21° F. and the summers are warm with a mean temperature of 66° F. Temperature differences between the regions listed are greater in winter than in summer. For instance, the difference between Orillia and Brantford is 6 degrees in winter and 1 degree in summer. The moderating effect of a large body of water on temperature is demonstrated by a comparison of the winter averages for Collingwood and Barrie. The winter temperature for Collingwood, which is farther north, is 2 degrees warmer than that for Barrie. In April the mean temperature at the three stations listed for Simcoe County has almost reached 42 degrees, which is sometimes used as a value to mark the beginning of crop growth.

The extreme high record is 104 degrees. The lowest temperature on record is minus 40 degrees, giving an extreme range of 144 degrees. The frost-free period averages 126 to 154 days from about the middle of May to the third week in September. The growing season has a length of 188 to 200 days. The longest frost-free period and growing season occurs in the immediate vicinity of Collingwood.

TABLE 3.

PRECIPITATION AT BARRIE, CAMP BORDEN, ORILLIA AND OTHER SELECTED POINTS

Month	Precipitation in Inches					
	Barrie (45)*	Camp Borden (10)*	Orillia (38)*	Brantford (51)*	Huntsville (30)*	Kapuskasing (19)*
December	2.92	2.24	2.99	2.24	3.28	1.90
January	3.25	2.46	2.63	2.61	3.09	2.00
February	2.08	2.03	2.21	2.12	2.45	1.06
Winter	8.25	6.73	7.83	6.97	8.82	4.96
March	2.49	2.04	2.00	2.16	2.78	1.56
April	2.02	2.13	1.95	2.54	2.09	1.82
May	2.54	2.71	2.68	2.90	2.35	2.12
Spring	7.05	6.88	6.63	7.60	7.74	5.50
June	2.77	2.95	2.80	2.65	3.69	2.33
July	2.77	2.68	2.79	3.05	2.96	3.43
August	2.79	1.96	2.56	2.93	2.70	2.94
Summer	8.33	7.59	8.15	8.63	9.35	8.70
September	2.69	2.53	3.09	2.63	3.84	3.54
October	2.69	1.97	3.16	2.47	3.44	2.50
November	3.19	1.98	3.40	2.40	3.24	2.39
Fall	8.57	6.50	10.55	7.50	10.52	8.43
Annual	32.20	27.68	32.26	30.70	36.41	27.59
May 1 to October 1	14.56	12.83	14.42	14.16	16.04	14.36

*Years observed

Precipitation includes both rain and snow with the latter recalculated to its rainfall equivalent in the ratio of ten inches of snow to one of rain. The average annual rainfall at Barrie and Orillia is almost the same with 32.20 and 32.26 inches respectively. Snowfall ranges from 60 to 110 inches. Less rain falls in the central part of the County since Camp Borden receives an average of only 27.68 inches. In general, the rainfall is lighter in March and April than during the growing season. This has a distinct advantage in that it permits the land to dry so that it may be cultivated.

The climate of Simcoe County consists, in brief, of moderately cold winters, fairly early springs, sunny warm summers and cool fall seasons.

Relief

The average altitude over most of Simcoe County is about 800 feet above sea level. In general, the land slopes in a northerly direction from a height

of 1000 feet in the southern part of Adjala Township to 600 feet near the shore of Nottawasaga. The relief is most rugged along the Niagara Escarpment in Nottawasaga Township where the altitude rises from 800 to 1600 feet above sea level over a distance of about 3 miles. Except for hilly areas in the southern and eastern parts of the County, the relief is mainly gently undulating.

Drainage

Almost two-thirds of Simcoe County is shoreline. On the east side are Lake Simcoe and Lake Couchiching, the Severn River forms part of the northern boundary and Georgian Bay occurs along part of the northern and western sides of the County. There are many rivers draining the area. The Nottawasaga, which is the largest, drains most of the southern and middle part of the County as it flows from the Tottenham-Bondhead area in a northerly direction, emptying into Georgian Bay at Wasaga Beach.

The Boyne, Pine and Mad Rivers flow in an easterly direction and empty into the Nottawasaga River. The Pretty and Batteau Rivers flow in a northerly direction and empty into Georgian Bay east of Collingwood. The northern part of the County is drained by the Wye, Sturgeon, Coldwater and North Rivers. These flow in a northerly direction and empty into Georgian Bay.

The location of the various lakes and rivers is shown in Figure 5.

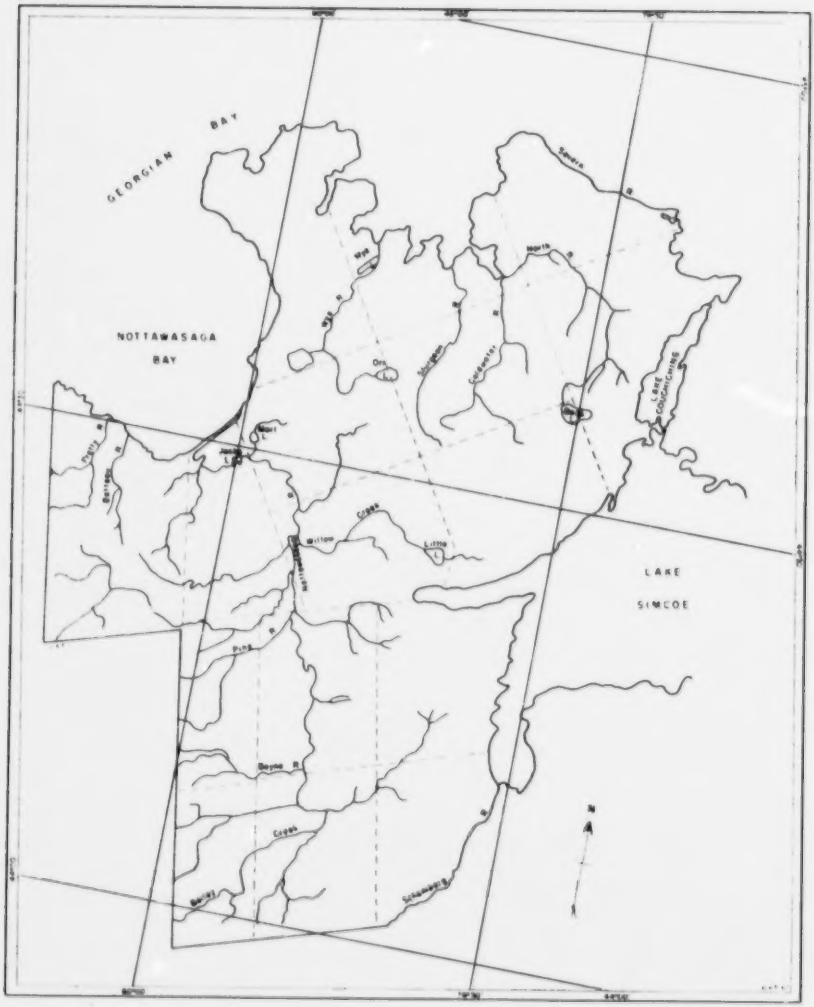


Figure 5: Outline Map Showing the Drainage System

THE CLASSIFICATION AND DESCRIPTION OF THE SOILS

The surface geological deposits previously described are the parent materials from which the soils of the County have developed. This development is expressed in several different forms as a result of the differences in the parent materials as well as the differences in drainage and in vegetation.

Under the cool, humid conditions present in this region, and under forest vegetation, the soil processes tend to develop acid conditions. This acid condition is caused by the removal of bases, particularly calcium, from the surface layers of the soil by percolating water. This is referred to as a process of leaching and the effect produced on the soil is to develop layers or horizons within the body of the soil that differ from one another in thickness, colour, texture or structure.

Soils of the Brown Forest Great Soil Group have shallow profiles and a brownish colour in the subsoil

A cut made through the horizons exposes what is known as the soil profile. In agricultural practice it is often customary to refer to the different layers of the soil as surface soil, subsurface soil, subsoil and parent material. However, because many soils have more than three horizons it is convenient to use the specific pedological terms A horizon, B horizon and C horizon which are further subdivided into A_0, A_1, A_2, B_1, B_2, C, etc.

The A horizon is the surface horizon and in many soils can be subdivided into A_1 and A_2. The A_1 horizon contains the largest amounts of organic matter and is underlain by the A_2 a horizon showing the effect of a great amount of leaching. Some of the materials leached from the A_2 accumulate in the B horizon. The B horizon is often finer in texture and more compact as a result of the accumulation of clay and other fine materials carried down from the A horizon. Underlying the B horizon is the C horizon a material which may be unaltered or only slightly altered by the soil forming processes. This material from which the soil has developed is known as parent material.

Grey-Brown Podzolic Soil Profile

Poorly drained soils in which ground water is present in the soil profile have a condition designated as "Gley". The gley horizon is a layer which can be recognized by bluish grey, brownish grey as well as mottled colours.

Soils are principally classified on the basis of the development of the horizons which constitute the soil profile.

One hundred and one soil separations were recognized and mapped in the County. These soils differ from one another in one or more of the following features of the soil profile — number, colour, thickness, texture, structure and chemical composition of the horizons, drainage, depth to bedrock, stoniness, and slope.

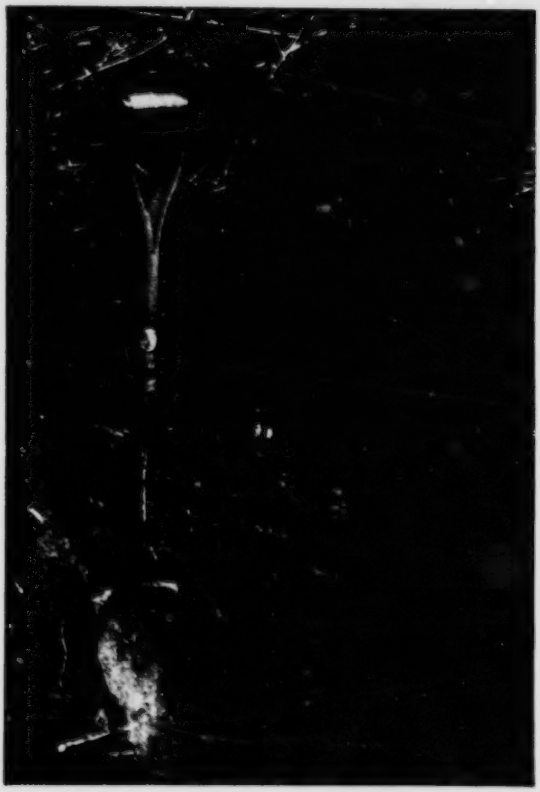
Many soil series, however, have certain features in common, and are grouped into what is called Great Soil Groups. In Simcoe County these are called Brown Forest, Grey-Brown Podzolic, Podzol, Dark Grey Gleysolic

Podzol Soil Profile

and Organic. A generalized description of a virgin soil profile occurring in each of these groups follows:

The Brown Forest soils occur chiefly on highly calcareous materials. These soils have a dark brown surface horizon high in organic matter with a neutral or mildly alkaline reaction. This A_1 horizon is about 4 inches in thickness and is underlain by a brown coloured B horizon containing some concentration of sesquioxides and occasionally a concentration of clay. In general, the B horizon shows no colour subdivisions and the brown colour carries down to the parent material at a depth of 18 inches. The base saturation of all horizons is 100 per cent.

The Grey-Brown Podzolic soils occur in most sections of the County but the largest areas are in the south. The profile has a dark greyish brown A_1 horizon, 3 inches thick and relatively high in organic matter, and underlain by a yellowish brown A_2 horizon that becomes lighter in colour with depth. The B horizon is brown in colour and is finer in texture than other



A Dark Grey Gleysolic Profile

horizons in the profile. It contains accumulations of clay and sesquioxides. The calcareous parent material occurs at depths of 20 to 30 inches.

The Podzol soils have a A_0 horizon 1 to 2 inches thick which is underlain by a grey or white A_2 horizon varying from 1 to 2 inches in thickness. The B horizon is reddish brown and contains concentrations of sesquioxides or organic matter or both and is usually divisible into two sub-horizons B_{21} and B_{22}. Most of the Podzols in the County have an additional B horizon containing an accumulation of clay and sesquioxides. This B horizon occurs at depths of 24 to 36 inches and appears to be similar to the Grey-Brown Podzolic B horizon.

Many of the soils of Simcoe County have developed under poorly drained conditions. The poorly drained soils of the County are representative of the Dark Grey Gleysolic and Organic Great Soil Groups.

The Dark Grey Gleysolic soils have a mineral surface soil high in organic matter and a dull coloured subsoil with yellow and orange mottling. The profile has a very dark grey A_1 horizon generally 7 to 8 inches thick. This is underlain by a mottled, dark grey to greyish brown "gley" horizon which rests on the parent material.

The Organic soils consist of an accumulation of decomposed plant material on the surface more than 12 inches thick. This is underlain by a strongly gleyed mineral soil or rock. The surface layer may vary depending on the type of vegetation and stage of decomposition.

Series, Type and Phase

The units by which soils are mapped and described are designated as series, types and phases. The principal mapping unit is the series which in turn may consist of two or more types or phases. The features that characterize the series are determined from the profile and all the soils included in a series are relatively uniform in their development. Soil series are subdivided into soil types by the texture of the surface soil. The full name of the soil type is a combination of the series name and the surface texture, for example, Bondhead loam. The soil phase is not a part of the natural classification of soils and can be a subdivision of the soil type, series or any other classification unit. Phases are usually subdivisions of soil types and are based on characteristics of the soil that are significant in its use for agriculture. These separations are introduced to show differences in slope, degree of erosion or content of surface stone.

Soil Catena

Soil series developed on similar parent material but differing in characteristics of the solum due to differences in drainage are included in the soil catena.

The soil catenas of Simcoe County are shown in the following table:

The Soil Catenas of Simcoe County

Catena Name	Catena Members		
	Drainage		
	Good	Imperfect	Poor
Bennington	Bennington	Tavistock*	Maplewood*
Bondhead	Bondhead	Guerin	Lyons
Bookton	Bookton	Berrien	Wauseon
Burford	Burford	Brisbane*	Gilford
Caledon	Caledon	Camilla*	
Dundonald	Dundonald	Edenvale	
Dunedin	Dunedin		Morley
Eastport	Eastport		
Farmington	Farmington	Franktown*	Brook*
Harkaway	Harkaway	Wiarton	Parkhill
Harriston	Harriston	Listowel	Parkhill
Medonte	Medonte	Lovering	Atherley
			Minesing
Osprey	Osprey		Lily*
Percy	Percy	Trent*	Foxboro*
Schomberg	Schomberg	Smithfield	Simcoe
Tioga	Tioga	Alliston	Granby
Vasey	Vasey	Howland*	Lyons
Vincent	Vincent	Kemble	Brookston*
Wyevale	Wyevale	Hendrie	

*These soils have not been mapped in Simcoe County.

KEY TO THE SOILS

A. Soils Developed on Till	Acreage	% of Total
1. Pale brown, stony, loam parent material.		
(a) Well drained (B.F.)		
(1) Osprey loam	1,300	0.1
2. Light grey sandy loam parent material		
(a) Well drained (G.B.P.)		
(1) Vasey sandy loam	71,700	6.9
(2) Vasey sandy loam — steep phase	17,500	1.7
(3) Vasey sandy loam — stony phase	13,400	1.3
3. Light grey, sandy loam or loam parent material		
(a) Well drained (G.B.P.)		
(1) Bondhead loam	41,400	4.0
(2) Bondhead sandy loam	33,900	3.3
(3) Bondhead sandy loam — steep phase	5,200	0.5
(4) Bondhead sandy loam — stony phase	3,600	0.3
(b) Imperfectly drained (G.B.P.)		
(1) Guerin loam	5,400	0.5
(2) Guerin sandy loam	1,700	0.2
(3) Guerin loam — stony phase	5,100	0.5
(4) Guerin sandy loam — stony phase	500	0.05
(c) Poorly drained (D.G.G.)		
(1) Lyons loam	1,700	0.2
(2) Lyons loam — stony phase	100	0.01
4. Pale yellow, loam or silt loam parent material		
(a) Well drained (G.B.P.)		
(1) Harriston loam	8,800	0.8
(2) Harriston silt loam	11,300	1.1
(3) Harriston loam — steep phase	2,000	0.2
(b) Well drained (B.F.)		
(1) Harkaway loam	1,400	0.1
(c) Imperfectly drained (B.F.)		
(1) Wiarton loam	12,700	1.2
(2) Wiarton loam — stony phase	800	0.08
(d) Poorly drained (D.G.G.)		
(1) Parkhill loam	2,100	0.2
5. Light grey, loam parent material		
(a) Well drained (B.F.)		
(1) Otonabee loam	17,100	1.6
(2) Otonabee loam — steep phase	400	0.04
(3) Otonabee loam — stony phase	2,200	0.2
6. Light brown, clay loam parent material		
(a) Well drained (B.F.)		
(1) Vincent clay loam	2,700	0.3
(b) Imperfectly drained		
(1) Kemble clay loam	1,000	0.1
(2) Kemble clay loam — shallow phase	2,200	0.2
7. Dark reddish brown, clay parent material		
(a) Well drained (B.F.)		
(1) Dunedin clay	500	0.05

B. Soils Developed on Outwash Materials	Acreage	% of Total
I. Sands		
1. Pale brown to grey parent material		
(a) Well drained (P)		
(1) Tioga loamy sand	75,500	7.3
(2) Tioga sandy loam	44,500	4.3
(3) Tioga fine sandy loam	17,900	1.7
(4) Tioga loamy sand — stony phase	5,000	0.5
(5) Tioga loamy sand — eroded phase	1,300	0.1
(6) Tioga loamy sand — steep phase	8,500	0.8
(b) Imperfectly drained (P)		
(1) Alliston sandy loam	63,500	6.1
(2) Alliston fine sandy loam	1,200	0.1
(3) Alliston sandy loam — stony phase	1,200	0.1
(c) Poorly drained (D.G.G.)		
(1) Granby sandy loam	17,900	1.7
(2) Granby fine sandy loam	4,500	0.4
(3) Granby sandy loam — stony phase	300	0.03
II. Gravels		
1. Brown parent material		
(a) Well drained (G.B.P.)		
(1) Caledon gravelly loam	1,000	0.1
2. Pale brown to grey parent material		
(a) Well drained (G.B.P.)		
(1) Burford gravelly loam	3,100	0.3
3. Pale brown parent material		
(a) Well drained (B.F.)		
(1) Sargent gravelly sandy loam	27,100	2.6
(2) Sargent gravelly sandy loam — steep phase	1,200	0.1
(b) Imperfectly drained (B.F.)		
(1) Gwillimbury gravelly sandy loam	1,900	0.2
(2) Gwillimbury gravelly sandy loam — stony phase	400	0.04
(c) Poorly drained (D.G.G.)		
(1) Gilford gravelly loam	800	0.08
4. Grey, non-calcareous parent material		
(a) Well drained (P)		
(1) Wyevale gravelly sandy loam	10,600	1.0
(b) Imperfectly drained (P)		
(1) Hendrie gravelly sandy loam	1,400	0.1
5. Sand materials underlain by loam or sandy loam till		
(a) Well drained (G.B.P.)		
(1) Dundonald sandy loam	16,000	1.5
(2) Dundonald fine sandy loam	1,000	0.1
(b) Imperfectly drained (G.B.P.)		
(1) Edenvale sandy loam	2,600	0.25
6. Sand materials underlain by clay		
(a) Well drained (G.B.P.)		
(1) Bookton sandy loam	9,000	0.9
(2) Bookton fine sandy loam	3,100	0.3
(b) Imperfectly drained (G.B.P.)		
(1) Berrien sandy loam	10,200	1.0
(2) Berrien fine sandy loam	3,400	0.3
(c) Poorly drained (D.G.G.)		
(1) Wauseon sandy loam	1,500	0.1
(2) Wauseon fine sandy loam	1,500	0.1

	Acreage	% of Total
C. Soil Developed on Lacustrine Materials		
1. Pale brown, fine loamy sand or fine sandy loam parent material		
(a) Well drained (G.B.P.)		
(1) Percy fine sandy loam	1,700	0.2
(2) Percy fine sandy loam — stony phase	200	0.02
2. Non-calcareous, varved, silt loam and clay parent material		
(a) Well drained (G.B.P.)		
(1) Medonte silty clay loam	1,800	0.2
(2) Medonte silt loam	3,600	0.3
(b) Imperfectly drained (G.B.P.)		
(1) Lovering clay	6,100	0.6
(2) Lovering silty clay loam	11,300	1.1
(3) Lovering silty clay loam — stony phase	300	0.03
(4) Lovering clay — stony phase	400	0.04
(c) Poorly drained (D.G.G.)		
(1) Atherley clay	6,100	0.6
(2) Atherley silty clay loam	5,900	0.6
(3) Atherley silty clay loam — stony phase	1,500	0.1
3. Calcareous, varved, silt loam and clay parent material		
(a) Well drained (G.B.P.)		
(1) Schomberg silty clay loam	47,800	4.6
(2) Schomberg silt loam	2,100	0.2
(3) Schomberg silty clay loam — steep phase	300	0.03
(4) Schomberg silty clay loam — stony phase	600	0.06
(b) Imperfectly drained (G.B.P.)		
(1) Smithfield silty clay loam	20,200	1.9
(2) Smithfield silt loam	6,800	0.65
(c) Poorly drained (D.G.G.)		
(1) Simcoe silty clay loam	3,100	0.3
(2) Simcoe silt loam	3,900	0.4
(3) Simcoe silty clay loam — stony phase	100	0.01
4. Very calcareous, marly, varved silt loam and clay parent material		
(a) Poorly drained (D.G.G.)		
(1) Minesing marly clay	10,900	1.0
(2) Minesing marly silty clay loam	4,200	0.4
5. Fine sandy loam or silt loam underlain by clay till or clay		
(a) Well drained (G.B.P.)		
(1) Bennington fine sandy loam	9,400	0.9
D. Soils Developed on Shallow Loam Till Over Limestone Bedrock		
(a) Well drained (B.F.)		
(1) Farmington loam	9,600	0.9
E. Soils Developed on Organic Materials		
(a) Very poorly drained (O)		
(1) Muck	60,600	5.8
F. Soils Developed on Alluvial Materials		
(a) Variable drainage (R)		
(1) Bottom land	4,900	0.5
(b) Very poorly drained (R)		
(1) Marsh	2,800	0.3

	Acreage	% of Total
G. Miscellaneous Soils		
1. Recent deposition		
(a) Rapidly drained (R)		
(1) Eastport sand	2,000	0.2
2. Consolidated materials		
(a) Well drained (R)		
(1) Rock	1,100	0.1
H. Soil Complexes		
(1) Rock — Atherley clay	67,100	6.4
(2) Atherley clay — Rock	7,900	0.8
(3) Medonte silty clay loam — Rock	800	0.08
(4) Smithfield silty clay loam — Berrien sandy loam	5,400	0.5
(5) Simcoe silty clay loam — Berrien sandy loam	4,100	0.4
(6) Parkhill loam — Edenvale sandy loam	4,900	0.5
(7) Osprey loam — Dunedin clay	10,100	1.0
(8) Osprey loam — steep phase — Dunedin clay — steep phase	13,600	1.3
(9) Wiarton loam — Edenvale sandy loam	1,000	0.1
(10) Tioga loamy sand — Vasey sandy loam	65,900	6.3
(11) Tioga loamy sand — Bondhead loam	22,200	2.1
(12) Tioga loamy sand — steep phase — Bondhead loam — steep phase	1,100	0.1
(13) Rock — Otonabee loam	2,000	0.2

B.F. — Brown Forest soils

D.G.G. — Dark Grey Gleysolic soils

G.B.P. — Grey-Brown Podzolic soils

O — Organic soils

P — Podzol soils

R — Regosols

SOIL DESCRIPTIONS

Osprey Series

The soils of the Osprey series occur chiefly near the western side of Nottawasaga Township. Other smaller areas are found in Orillia Township. The Osprey soils have an irregular steeply sloping topography and the steep slopes usually interfere with the use of heavy machinery.

The Osprey soils are developed on a material which has been derived mostly from limestone. Free carbonates are usually present at a depth of 18 inches. However, free carbonates occur on the soil surface in some locations. The open nature of the soil and the steep slopes provide good drainage. Danger of erosion is great on these soils because of the steep slopes. Slopes should be permitted to remain covered with trees or grass as long as possible to prevent soil loss. The tree cover on the virgin soils consists largely of sugar maple and beech with some balsam, ironwood, ash and elm.

Soil profile of Osprey loam

The land use of the Osprey soils is handicapped by stoniness as well as by steep slopes. The amount of stones varies considerably and they have been removed from the less stony fields making them more suitable for agricultural crops.

Osprey loam is the only soil type mapped, and is classified as a Brown Forest soil, although in some places the profile is considered to be a weakly developed Grey-Brown Podzolic. The soil profile consists of a very dark grey A_1 layer, 4 or 5 inches thick followed by a dark brown B layer which grades into the pale brown, stony parent material at a depth of about 18 inches. Stones and boulders occur throughout the profile.

The Osprey soils are used chiefly as grazing land for livestock. The good drainage condition of the soil permits it to warm up early in the spring and produce early grass. Clovers, alfalfa and grasses provide roughage for livestock and also provide a dense cover to retard loss of soil by erosion. Spring grains, wheat and silage corn are grown on the more gentle slopes but yields are generally low as a result of the low fertility of much of the land. The levels of phosphorus and potassium in the soil are low and fertilizers high in these elements are usually required. Good management practices should include the addition of large amounts of barnyard manure. Crops may suffer from lack of moisture during a part of the growing season. Additions of barnyard manure will increase the moisture holding capacity of the soil as well as the organic matter content.

On the Osprey soils the yields of timothy and clover hay average 1 to 1½ tons to the acre, corn produces 10 to 15 tons of silage and barley and oats yield 20 to 30 bushels of grain per acre.

Vasey Series

The Vasey series occupies almost 10 per cent of the total land area in Simcoe County and is one of the major series occurring in the County. The topography of the Vasey soils is smooth moderately to steeply sloping and the slopes, in many places, are sufficiently steep to interfere with the use of heavy farm implements.

These soils are developed on a material which has been derived from limestone mixed with varying amounts of granite. The limestone composition is not uniform and the depth in the soil at which free carbonates are reached is variable. The open porous nature of the soil and the rolling topography provide good drainage conditions. The Vasey soils will erode but much of the soil loss can be prevented as long as the steepest slopes remain covered with trees or grass. The tree cover in the woodlots consists mainly of sugar maple but also some silver birch, poplar, oak, ironwood and elm.

The amount of stone in this soil varies considerably. In general the Vasey soils occurring in the region between Barrie and Orillia are not as stony as those in other parts of the County. The stones have often been removed from the less stony fields to prepare them for cultivation. However, large areas remain where stones seriously interfere with cultivation.

The only soil type mapped is the Vasey sandy loam. Where the land has more stone than is common a stony phase (13,400 acres) has been mapped.

In other places where slopes are very steep a Vasey sandy loam — steep phase (17,500) has been mapped.

The soil profile is Grey-Brown Podzolic and consists of a thin very dark greyish brown A_1 horizon underlain by a light olive-brown A_2 horizon which becomes lighter in colour with depth. At 30 inches an olive-brown B horizon containing more clay than the layers above or below it occurs but this horizon shows weaker development than is usual for the Grey-Brown Podzolic soils. This rests on light grey, calcareous, sandy loam parent materials. Free carbonates can be detected in the profile at an average depth of 40 inches.

The Vasey soils are used for general farming. Due to good drainage conditions the land warms up in the spring to produce early pasture for livestock. However, during prolonged dry periods plants suffer from lack of moisture. Clover, grasses, oats, barley and silage corn are the main crops grown and under average farm management yields on these soils are low. Potatoes are grown on the less stony fields.

Manure is essential to help maintain the fertility and to increase the humus content and moisture holding capacity of the surface soil. The soil is low in phosphorus and potassium and fertilizers high in these elements should be used. Nitrogenous fertilizers are necessary on fields which have not been manured or which have not been used to grow legumes for some period of time. Nitrogen is particularly beneficial to the corn crop. Good management practices should include the control of sheet erosion which may be severe on the steep cultivated slopes.

Bondhead Series

The Bondhead soils occupy about 8 per cent of the County area and occur in the southwestern part of the County. The topography is smooth moderately to steeply sloping. Most of the land consists of moderate slopes but 5,200 acres is made up of steeply sloping land and has been mapped as a steep phase. The surface soil is slightly stony except in areas that have been mapped as stony phase where the surface is strewn with stones and boulders. The stony phase occupies 3600 acres.

The drainage is good and the soil is porous. Soil losses due to erosion may be moderate to high particularly on steep slopes which have been left without a vegetative cover. The trees occurring in woodlots consist mainly of beech and sugar maple with some ironwood, elm, ash, balsam and white pine.

In West Gwillimbury and Tecumseth Townships the Bondhead soils occur on the top of some of the hills and ridges but not along the lower slopes. The soils occurring on the lower slopes are of lacustrine origin and belong to the Schomberg series.

The soil types mapped in the Bondhead series are the loam (41,000 acres) and sandy loam (33,900 acres). Except for differences in texture both types have the same profile characteristics. These soils are considered typical of the Grey-Brown Podzolic Great Soil Group. The profile consists of a very dark greyish brown A_1 horizon about 3 inches thick which is underlain

by an A_2 horizon of yellowish brown colour which grades to a light grey. This is underlain by a dark brown B horizon which occurs at a depth of about 24 inches and contains more clay than the layers above or below it. This rests on light grey calcareous loam or sandy loam till parent materials. The surface reaction varies from slightly acid to neutral and the addition of lime is not required for crop production.

The Bondhead soils are well suited to most types of farming but are used in Simcoe County chiefly for dairying and mixed farming. The land warms up in the spring and produces early grass. Water supply during the pasturing season is maintained by numerous streams or abundant well-water. Clovers, alfalfa, grasses and silage corn which are used as roughage for livestock produce good yields on these soils. Good yields of oats, barley and winter wheat are also obtained. Provided climatic conditions are satisfactory, canning crops and tree fruits can also be grown with fair success.

Profile of Bondhead loam

Additions of barnyard and green manures will increase the moisture holding capacity of the soil and will improve tilth. Most crops respond to applications of superphosphate or mixed fertilizers high in phosphate and

yield increases also occur after additions of nitrogenous fertilizers. Nitrogen response is most marked on fields which have not been manured or have not been used to grow legumes for some period of time. Potassium is usually beneficial to corn, potatoes, and canning crops, but yield increases due to this element are often lower on cereal grains.

Erosion may be severe on the steep cultivated slopes. Such areas should be kept under a permanent cover of trees or grasses. Where a permanent cover is impractical and it is necessary to cultivate the steeper slopes, farm practices such as contour cultivation and strip cropping should be followed to reduce soil loss.

Guerin Series

The Guerin soils are found in association with the Bondhead and Vasey soils in Simcoe County and occupy the gently undulating land occurring between the hills. Surface stones interfere with cultivation on almost half of the land included in the Guerin series. Stony areas have been mapped as a stony phase of the appropriate soil type.

The soil drainage is imperfect, for although the soil materials are the same as those of the Bondhead soils and are reasonably porous, water run-off over the gentle slopes is slow. As may be expected, erosion is slight on gentle slopes and seldom presents a problem. The trees in woodlots consist mainly of elm and soft maple with some spruce, ash and balsam.

The soil types mapped in the Guerin series are the loam (5,400) and sandy loam (1,700). In addition 5,100 acres of loam-stony phase and 500 acres of sandy loam-stony phase have been mapped in the County. The Guerin soils occupy about 1.3 per cent of the total land area.

The profile of the Guerin soil is typical of the gleyed Grey-Brown Podzolic soils and possesses a very dark greyish brown A_1 horizon about 4 inches thick. This horizon is moderately stony and slightly acid in reaction. It is underlain by a mottled yellowish brown A_2 horizon which is the most acid layer in the profile. The B_2 horizon is mottled and brown in colour and contains more clay than the layers above or below it. Calcareous, light grey loam to sandy loam till occurs below the B_2 at a depth of about 20 inches. In some places the whole of the A_2 horizon has been mixed with the surface layer by cultivation or other disturbances and is therefore not recognizable.

Because of imperfect drainage and the presence of a great number of surface stones, the Guerin soils are not as well suited for agricultural use as the Bondhead soils. They are used for general farming or dairying and hay and pasture grasses are the main crops grown. Stony areas are used for grazing since cultivation is impractical. Some areas are used to grow spring grains and fall wheat, and yields, during dry seasons, are good.

The maintenance of organic matter and phosphorus is important. Most crops respond to applications of superphosphate or mixed fertilizers high in phosphate. Barnyard manure should be used wherever possible and is

recommended as a topdressing for pastures. The reliability of these soils can be increased by artificial drainage such as tiles or open ditches. However, the installation of tile may be difficult because of the presence of stones.

Guerin loam. The B horizon is not as well developed as that of the Bondhead

Lyons Series

Occupying less than half a per cent of the total land area of the County, Lyons is one of the less important series in the area. The soils of this series occur in the depressional areas associated with the Bondhead soils. Because the soils occupy the depressional areas, surface runoff is very slow and drainage is poor.

Lyons loam (1,800) is the only soil type mapped in this series in Simcoe County. Of the 1800 acres, 100 acres of stony phase has been mapped. Lyons loam is a Dark Grey Gleysolic soil having a very dark greyish brown A_1 horizon about 6 inches thick. This layer is neutral in reaction and contains a large amount of organic matter. A grey, very mottled gley horizon underlies the A_1 and it seems to contain little or no accumulation of clay. The gley horizon rests on grey, calcareous loam to sandy loam till at a depth of about 20 inches.

The Lyons soils are used chiefly for pasture. In many areas the pasture crop has been allowed to deteriorate so that its carrying capacity is low. Weeds and small bushes, such as willow and alder, have choked out the natural grasses and clovers. Such fields might be better if they were cleaned

up, reseeded and used to provide pasture for stock during dry season when grasses in better drained locations have turned brown.

In most instances the installation of artificial drains in the Lyons soils in Simcoe County is impractical because the areas are small and outlets are often difficult to find.

Harriston Series

The soils of the Harriston series occur chiefly in Nottawasaga Township and occupy slightly over 2 per cent of the County area. For the most part slopes are smooth and the topography is moderately rolling. However, the land near the escarpment has been dissected by numerous small streams and here the topography is irregular and slopes are short and steep.

The soils are well drained and have developed from loam till which contains a moderate amount of stone. The upper part of the soil is stone-free and as a result these soils have a desirable texture and are easy to cultivate.

The soil types mapped in Simcoe County within the Harriston series are the loam (10,800) and the silt loam (11,300). The loam soil type contains 2,000 acres of land mapped as a steep phase. This phase consists of areas in which slopes are much steeper than usual. Also in areas mapped as Harriston, there are occasional pockets of Tioga sandy loam which are not shown on the map as they are too small for that scale of mapping. These sand pockets occupy less than 5 per cent of the land area included in the Harriston series.

The Harriston soils have a typical Grey-Brown Podzolic profile which consists of a dark greyish brown, slightly acid to neutral A_1 horizon about 4 inches thick. This layer rests on a light olive-brown A_2 horizon which becomes lighter in colour with depth, is the most acid horizon in the profile and is underlain by an olive-brown B_2 horizon. The B_2 horizon contains more clay than the layers above or below it. The pale yellow, calcareous loam till from which the profile developed is usually found at a depth of about 25 inches.

Judging from existing woodlots the natural vegetation was chiefly sugar maple and beech. However, most of the land is now cleared and is used for dairying and general farming. Spring grains, fall wheat, alfalfa, red clover and timothy are the chief crops grown. Apple orchards were common on the Harriston soils but they have been neglected for the most part, and the old and broken trees have not been replaced with new stock.

In the production of general farm crops, the Harriston soils will respond to additions of phosphorus and nitrogen. Potassium is considered to be of special importance in the growing of fruit and vegetable crops. These fertilizer elements can be provided by the use of mixed fertilizer. Nitrogen, also an important element in successful crop production, can be provided by additions of barnyard manure or by the growing of clovers. The need for organic matter in the soil cannot be overemphasized, particularly because of its influence on soil tilth, and is supplied by the use of barnyard manure.

Landscape scene of Harriston loam

Erosion may be severe on the slopes and steps should be taken to prevent or reduce the loss of soil. Soil loss can be reduced by keeping the land under cover as much as possible, by cultivation across rather than up and down the slope, and by numerous other special practices such as contour tillage, grassed waterways and strip cropping. It is suggested that greater use be made of grassed waterways to prevent the formation of gulleys that are becoming more prevalent on the Harriston soils in the County.

Crop yields on the Harriston soils are usually good. Average yields for some farm crops are 70 bushels per acre for oats, 40 bushels per acre for fall wheat and 2½ tons per acre for hay. Although higher yields than these are possible they are reduced considerably in fields where soil loss has been severe.

Harkaway Series

The Harkaway soils were found originally in Grey and Bruce Counties where they occupy large acreages. In Simcoe County only 1,400 acres were mapped and these are located in the northern part of Nottawasaga Township.

The Harkaway soil is developed from light yellowish brown loam till, which is derived from limestone. The till was deposited by glacial ice in the form of ground moraine and drumlins. The drumlins are long and narrow and may be referred to as being cigar-shaped. The ground moraine has a moderately rolling topography with steeper slopes occurring on the sides of the drumlins.

Harkaway loam is a well drained soil. Water runs rapidly off the rolling slopes and the part that enters the soil percolates readily through the open soil materials. In the virgin or uncultivated state the soil possesses a relatively deep, dark coloured surface. In cultivated fields much of it has been lost by erosion and the lighter coloured material which was below now shows up particularly on the steeper slopes. As the finer material is removed by water the surface also becomes more stony.

Soil development in the profile shows some of the characteristics of both the Brown Forest and Grey-Brown Podzolic soils. The A_2 horizon of the latter is often missing but a fairly well developed textural B horizon is nearly always present. The thin solum is also one of the distinguishing characteristics of this soil compared with similar textured soils in other parts of the province. The soil profile has a very dark brown A_1 horizon about 5 inches thick that rests on an olive-brown B horizon. The B horizon becomes somewhat darker in colour with depth and contains more clay than the layers above or below it. The parent material occurs at depths of 12 to 18 inches. The profile is moderately stony and may be calcareous throughout.

This soil is used for growing oats, mixed grains, hay and pasture. The surface soil is friable, possesses a granular structure and is easy to cultivate as long as the stones do not interfere. Mixed farming with the main income being derived from livestock is the chief type of farming practised on the Harkaway soils. Crops in this region respond to applications of phosphorus, and manures are required to maintain organic matter levels.

Good drainage and high lime content make this soil a good medium for growing alfalfa. It would appear that most leguminous crops will flourish here and are considered as a necessary forage for livestock.

Wiarton Series

Wiarton soils occur chiefly in Nottawasaga and Sunnidale Townships and occupy about 1.5 per cent of the County area. These soils have developed from pale yellow, calcareous loam textured till which contains a comparatively large amount of silt. The topography is gently undulating with slopes of about 3 per cent. Because the slopes are gentle soil losses due to erosion are slight.

Very little water runoff occurs, and in addition, water percolates slowly through the soil since the till is somewhat compacted. As a result these soils are imperfectly drained. Stones are common both on the surface and throughout the soil profile but usually do not occur in sufficient numbers to interfere very seriously with cultivation. However, there are a few areas where stones do interfere with cultivation. These are shown on the map as a stony phase of Wiarton loam (13,500).

The Wiarton series is the imperfectly drained member of the Harkaway catena. The profile of the Wiarton soil is typically Brown Forest with a very dark brown, slightly alkaline A_1 horizon. This layer rests on a light olive-brown, mottled B horizon which contains little or no accumulation of clay. This horizon is usually calcareous and is underlain by pale yellow to yellowish brown till at a depth of about 14 inches.

All of these soils are cleared except for a few remaining woodlots. The land is used chiefly for dairying and general farming, but, because it tends to be somewhat cold and wet, hay and pasture are the main crops grown. Oats, mixed grains and silage corn are grown in some areas and yields are good in dry years.

This soil could be made more reliable for crop production by the use of tile drains which would help to remove the excess water present in the soil.

Wiarton soils are high in lime but are commonly low in phosphorus. Potassium and nitrogen contents are medium. Therefore, for best results phosphorus is required for all crops whereas potassium and nitrogen are needed only to maintain the levels of these elements in the soil or where the need is indicated by soil test.

Parkhill Series

The soils of the Parkhill series occupy 2,100 acres in the County and are of relatively little importance. Very gently undulating topography and compact till prevent the free movement of water over the surface and through the soil and as a result the soil is poorly drained. Therefore, it is cold and wet until late in the spring.

The Parkhill soils are found in association with the Harriston and Wiarton soils in Simcoe County and, in common with these soils, have developed on calcareous, yellowish brown till. Parkhill loam is the only type mapped in the County.

The profile consists of a very dark brown to black A_1 horizon that is about 7 inches thick and is slightly alkaline in reaction. This is underlain by a very mottled G horizon which is light brownish grey in colour and may or may not be calcareous. The G horizon can sometimes be subdivided into G_1 and G_2 horizons on the basis of structure. Differences in structure in this layer are usually those of size, with the smaller aggregates occurring near the top of the horizon. The depth of the profile varies from 12 to 16 inches. However, in other parts of Ontario the depth to the parent material is about 24 inches. This material is a light yellowish brown to grey, calcareous loam till.

Because the Parkhill soils are wet for long periods in the spring, they are slow to warm and cultivation is usually delayed. As a result, the land is chiefly used for the growing of pasture and hay. However, when the season is dry or where artificial drains have been installed, oats, mixed grains and silage corn can be grown with success.

Parkhill soils are fairly well supplied with plant nutrients and crops generally respond only to additions of phosphorus. The soils are high in organic matter where they have not been intensively cultivated. Where cultivation is frequent, additions of manure are needed to maintain the organic matter content.

Otonabee Series

The Otonabee soils are located chiefly in Orillia Township and occupy almost 2 per cent of the total land area. Although these soils do not occupy

a large part of Simcoe County, they are widely distributed in the counties of Ontario, Victoria and Peterborough.

These soils are well drained both externally and internally. The topography varies somewhat in different parts of the County. In the vicinity of Orillia the land is moderately rolling but in the more northern parts of Orillia Township the slopes are more gentle.

In the uncultivated state or in gently rolling areas these soils have a deep and dark coloured surface. In cultivated fields with steeper slopes, however, much of it has been lost through erosion and the lighter coloured material which was below now shows at the surface. As the finer material is removed by water, the surface becomes more stony. In any case, the Otonabee soils of Simcoe County are stonier than those of other counties. In some areas stones are so numerous that they seriously interfere with cultivation and a stony phase has been mapped.

Only one soil type, the Otonabee loam, is mapped in the County. Altogether, there are 19,700 acres of Otonabee loam in the County. Of this amount 400 acres is mapped as a stony phase and 2,200 acres as a steep phase.

Soil development in the profile shows some of the characteristics of both the Brown Forest Great Soil Group and of the Grey-Brown Podzolic soils. The A_2 horizon of the latter may or may not be present but where it does occur it is usually thin. A textural B horizon is nearly always present.

The soil profile is moderately stony throughout and possesses a very dark brown surface horizon about 5 inches thick. This is underlain by a dark brown B horizon which contains somewhat more clay than the layers above or below it. The parent material, which occurs at depths of 14 to 18 inches, is a loam to sandy loam till containing a moderate amount of stone. This material is calcareous since it is derived from limestone rock containing a large amount of calcium carbonate. The soil is frequently calcareous throughout.

These soils will grow a wide variety of crops where stones do not seriously interfere with cultivation and where slopes are not too steep. In Simcoe County they are used chiefly for mixed farming and to some extent, dairying. Oats, mixed grains, silage corn, hay and pasture are the main crops grown. Winter wheat is sometimes grown as a cash crop.

Commercial fertilizers are used to some extent and are necessary for both the grain and hay crops. All crops respond to applications of phosphorus and, in some instances, nitrogen. All available barnyard manure should be put on the land to maintain not only the level of organic matter but also to improve the moisture holding capacity of the soil.

Vincent Series

There are 2,700 acres of Vincent soils in Simcoe County. This soil is found near the base of the Niagara Escarpment in the northwestern part of Nottawasaga Township and is more widely distributed in the adjoining county of Grey.

The topography is moderately rolling with the overall slope decreasing as one travels from west to east. The slope of the main area of Vincent clay loam drops 200 feet in a mile, which is a drop of approximately 4 feet for every 100 feet of distance travelled. In these soils the external drainage is rapid but internal drainage is only medium because of the fineness of the soil materials. The soil is very susceptible to erosion and soil losses have been high in some fields, especially near the small rivers and creeks that dissect the soil areas.

The soil parent material consists of clay loam till that is slightly stony and contains a moderate amount of grit and gravel. This is calcareous material derived principally from limestone and brown sandstone.

Soil development in the profile shows some of the characteristics of both the Brown Forest and the Grey-Brown Podzolic soils. The A_2 horizon of the latter is often present, except when lost by erosion, but is thin. The B horizon contains more clay than the layers above it but differences in clay content between horizons are not great.

The soil profile has a dark greyish brown A_1 horizon about 4 inches thick, which is underlain by a yellowish brown B horizon that becomes somewhat darker in colour with depth. The upper B horizon might be considered to be the beginning of an A_2 horizon. The unaltered parent material occurs at a depth of approximately 20 inches.

The Vincent soil is used chiefly for mixed farming. Oats, mixed grain, hay and pasture are the main crops grown. Crop growth on well managed fields is good, with average yields of 70 bushels per acre of oats and 2½ tons per acre of alfalfa hay being reported.

Most crops respond to applications of superphosphate or a fertilizer mix high in phosphorus. Because of the danger of erosion, it is not wise to grow row crops too often in the same field or on the more steeply sloping land. Even the grain crops should not be sown without taking the proper precautions to reduce soil loss. Therefore, wherever possible, it is recommended that the land be cultivated on the contour or the crop sown in strips across the slope.

Kemble Series

The Kemble soils occupy 3,200 acres in the northern part of Nottawasaga Township. Here most of the soil is underlain by limestone bedrock at depths of less than 2 feet. These areas of shallow soil, located near Collingwood, are shown on the map as Kemble clay loam — shallow phase and occupy 2,200 acres. The clay loam is the only type mapped in the County.

These are imperfectly drained soils developed from the same materials as the Vincent soils. The topography is gently undulating.

Profiles show the characteristics of the Brown Forest Great Soil Group. There is no A_2 horizon and little or no evidence of clay accumulation in the B horizon. The soil profile possesses a very dark brown A_1 horizon about 5 inches thick which rests on a mottled brown B horizon. The B horizon is underlain by the parent material which occurs at a depth of approximately 14 inches. The profile is slightly stony and often calcareous from top to bottom.

Areas of deep soil are used chiefly for hay and pasture, since prolonged periods of wet weather prevent cultivation of the soil or harvesting of the crop. The reliability of this soil could be improved by the installation of some system of artificial drainage.

Because of the proximity of the bedrock, the shallow soil has not been developed and at present is covered with small trees and bushes. Drainage improvement is not feasible because of the presence of the rock. Therefore, this land is considered to be non-arable.

Dunedin Series

The soils of the Dunedin series form part of a very complex area around the Niagara Escarpment in Nottawasaga Township. It was possible to separate only 500 acres of these soils and show their location on the soil map. The remaining form what is called the Dumfries-Dunedin complex, which is discussed more fully later on in this report.

The face of the Escarpment in Nottawasaga Township is comparatively steep, rising 800 feet in a little more than half a mile in many places. These areas have many deep gullies and stream beds. As a result the topography is very rugged and slopes are short and steep. The Dunedin soils have developed from dark reddish brown till materials containing over 60 per cent. of clay. Because of the large percentage of clay in the soil, it is very slowly permeable to water and, therefore, internal drainage is very slow. External drainage over the steep slopes is, of course, very rapid. These soils are therefore well drained.

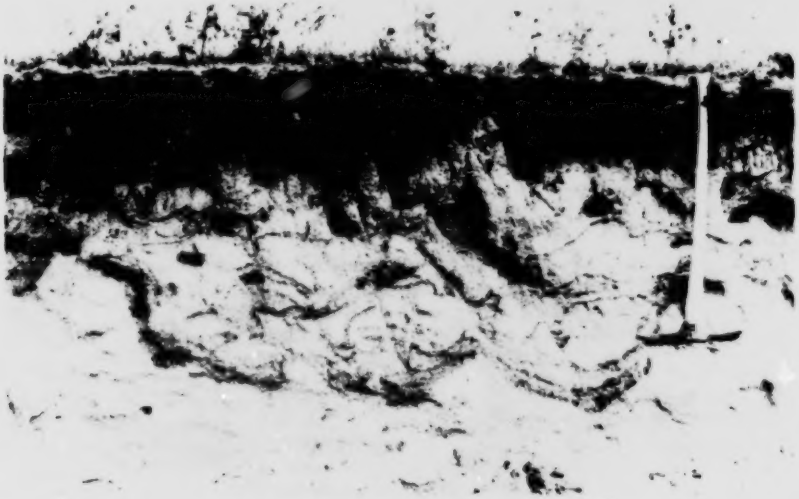
Characteristics of both Grey-Brown Podzolic and Brown Forest soils are present in this series. The A_2 horizon of the former is seldom present but the concentration of clay in the B horizon commonly occurs. The thin solum of the Brown Forest soils is typical of the Dunedin soils. The soil profile has a dark brown A_1 horizon about 4 inches thick which rests on a reddish brown B horizon. The B horizon becomes slightly darker in colour with depth and has a blocky structure. The parent material occurs at an average depth of about 14 inches and is calcareous.

Because of the very steep slopes and the clay texture, these soils should be considered non-agricultural. Areas that are presently cultivated should be put under a permanent cover of grass or trees and used for forestry or recreation.

Tioga Series

Soils of the Tioga series are located in every township in Simcoe County. They occupy 152,700 acres — almost 15 per cent of the total land area. Included in the series are the loamy sand, sandy loam and fine sandy loam soil types.

The Tioga soils have developed on calcareous outwash sands and they are usually stonefree. However, there are approximately 5,000 acres of these soils where numerous stones occur on the soil surface and have been mapped as Tioga loamy sand - stony phase. There are also a few areas where the surface and a large part of the subsoil have been wind blown. These denuded areas are called an eroded phase of Tioga loamy sand.



Tioga loamy sand. Note the thin wavy B horizon

Potatoes are grown commercially on Tioga fine sandy loam

In general, the topography is gently undulating and slopes are long and smooth. An area of 8,500 acres consisting of steep, short slopes has been mapped as Tioga loamy sand - steep phase. The Tioga soils are well drained and have open materials with a low moisture holding capacity.

The profile has the characteristics of the Podzol soils with evidence of Grey-Brown Podzolic development occurring in the lower part. The Grey-Brown Podzolic development in these soils consists mainly of a thin, weakly developed B horizon which contains more clay than the layers above or below it. The Tioga profile has a very dark, greyish brown A_1 horizon about 1 inch thick which rests on a light grey to white A_2 horizon. The A_2 horizon is thin and has a strongly acid reaction. It is underlain by a yellowish brown B horizon which becomes lighter in colour with depth. This layer rests on the thin, wavy B horizon. Usually this B horizon occurs at depths of 36 to 48 inches but, because of the wavy nature of this layer, it may be found anywhere between 18 inches and 72 inches. It not only varies considerably in depth but also varies in thickness. It is commonly 2 inches thick but may also be 4 inches thick or consist of numerous strands of $\frac{1}{2}$ to $\frac{1}{4}$ inch thickness separated by lighter coloured sandy material. The parent material is pale brown calcareous sand and usually occurs immediately below the B.

Nearly all of the Tioga soils are cleared and used for agricultural purposes. There is considerable variation, however, in the kind of farming found on these soils. The Tioga soils have a low natural fertility and a low moisture holding capacity but they warm up early in the spring and are easily worked. They can be used for certain cash crops which will pay for the fertilizers and irrigation needed to make crop growing on these soils a success.

A wide range of high value cash crops such as tobacco, cherries, apples, raspberries, strawberries, asparagus, tomatoes, potatoes, cabbage and radishes are grown but only in certain districts. For example, tobacco is the main cash crop in the Alliston area and in the district around New Lowell. Tender fruits and vegetables are grown on these soils around Collingwood where the waters of Nottawasaga Bay have a moderating effect on the climate. Excellent potato crops are grown on these soils near Alliston and in the vicinity of Lafontaine.

Large acreages of these soils are used for mixed farming. The cash returns from general farm crops such as hay, oats and barley are low and heavy fertilization is required to obtain satisfactory crop yields. More fertilizer is used on high value crops such as tobacco and vegetable crops than on cereal crops and pasture. Many of the pasture fields are weedy and contain low quality grasses. It is suggested that, where these soils cannot be used for cash crops, because of physical limitations such as severe erosion, stoniness or steep slopes, they be re-forested.

Tioga soils are very susceptible to damage by wind erosion. Wind erosion has been most severe in the tobacco growing areas where the soil cover is sparse for a large part of the year. Greater use of windbreaks or strip cropping should be introduced to reduce the loss of soil.

Phosphorus, potassium and nitrogen are required in varying amounts by most crops grown on these soils. The amount and kind of fertilizer not only depends on the soil but on the kind of crop grown. Fertilizer requirements are best determined by a soil test.

A Tobacco Farm Located on Tioga sandy loam

Alliston Series

The Alliston soils are associated with the Tioga soils and commonly occupy the more level parts of the sandy outwash plain where water movement is not so free. They are imperfectly drained and hence differ from the Tioga soils mainly in drainage.

The soils of the Alliston series occupy over 6 per cent of the total land area of the County and are found chiefly in Nottawasaga, Tecumseth, Sunnidale and Tosorontio Townships. The topography is level to very gently undulating. The soil is stonefree except for an area of 1200 acres in which surface stones are fairly numerous. These stony areas are shown on the map as Alliston sandy loam - stony phase. The soil types included in the Alliston series are sandy loam and fine sandy loam.

These soils have developed many similarities with the Tioga soils, having some of the characteristics of the Podzol Great Soil Group but with evidence of Grey-Brown Podzolic development in the lower part of the profile. However, in addition to these characteristics, they are also mottled at the upper part of the profile. The profile has a thin black A_1 horizon underlain by a light grey A_2 horizon. The A_2 horizon rests on a yellowish brown, mottled B horizon which becomes lighter in colour with depth and is underlain by a slightly darker coloured, mottled B horizon. This latter B horizon is about 2 inches thick, occurs at a depth of about 30 inches in the profile, and contains more clay than the layers above or below it. Pale brown, calcareous sand parent material occurs at a depth of about 32 inches.

Because the Alliston soils tend to be wet during parts of the year, they are not used to grow cash crops to the same extent as the Tioga soils. However, they are used for mixed farming. Hay, pasture and mixed grains are grown with varying success. These soils have a low natural fertility and most crops will respond to applications of phosphorus, nitrogen and potassium. Lime may be required on most fields, especially where legumes are grown.

A wider range of crops can be grown in fields that have been artificially drained. Market garden crops and certain fruits are being successfully grown on areas that are tile drained.

Granby Series

The Granby soils are found in the depressional parts of the sandy outwash plains and are associated with the Tioga soils. They occupy 22,500 acres or about 2 per cent of the total land area. Of this acreage, 17,900 acres is Granby sandy loam and 4,500 acres is Granby fine sandy loam. There are

A Profile of Granby sandy loam

a few small areas which have stones scattered over the surface and these are included in the stony phase of Granby sandy loam.

The Granby soils are poorly drained and they stay wet a large part of the year. Soil development is influenced by this wetness and the profile no longer has the colourful appearance of the well drained Tioga soils but instead is a drab, mottled grey. The profile is characteristic of the Dark Grey Gleysolic soils and has a black A_1 horizon about 7 inches thick. This rests on a mottled greyish brown gley horizon which becomes lighter in colour with depth. The parent material, which occurs at depths of 20 to 24 inches, is a pale brown to grey calcareous sand.

Very few of the Granby soils are cultivated. They are covered with trees and brush and are often used as wildlife and water reservoirs.

Caledon Series

Caledon gravelly loam is the type name for these soils in Simcoe County and it occupies 1,000 acres in the southern part of Nottawasaga Township.

They are well drained soils formed on gravels derived from limestone and brown calcareous sandstone. The topography is moderately rolling and slopes are short. Water percolates rapidly through the coarse soil materials with only a medium amount of runoff carrying down over the rolling slopes. The soil is well drained.

The soil profile has a dark greyish brown A_1 horizon about 3 inches thick. This rests on a yellowish brown A_2 horizon which becomes lighter in colour with depth and which is underlain by a dark brown B horizon containing more clay than the layer above or below it. These are the characteristics of the Grey-Brown Podzolic Great Soil Group. The gravel occurs at 28 to 36 inches and is brown in colour and calcareous. The sand content of the soil profile is high, with the amount varying from about 45 to 75 per cent. In other counties such as Dufferin and Peel, where this soil is located, the upper part of the profile contains little or no gravel. Indeed, in some places, there is considerable variation in the amount of gravel in the surface soil in various parts of the same field.

Caledon soils are used chiefly for mixed farming, and crops such as oats, mixed grains, silage corn, hay and pasture are grown. These soils could be used for crops such as fruit and vegetables but they are located in areas where the climate is a little too cool for successful production.

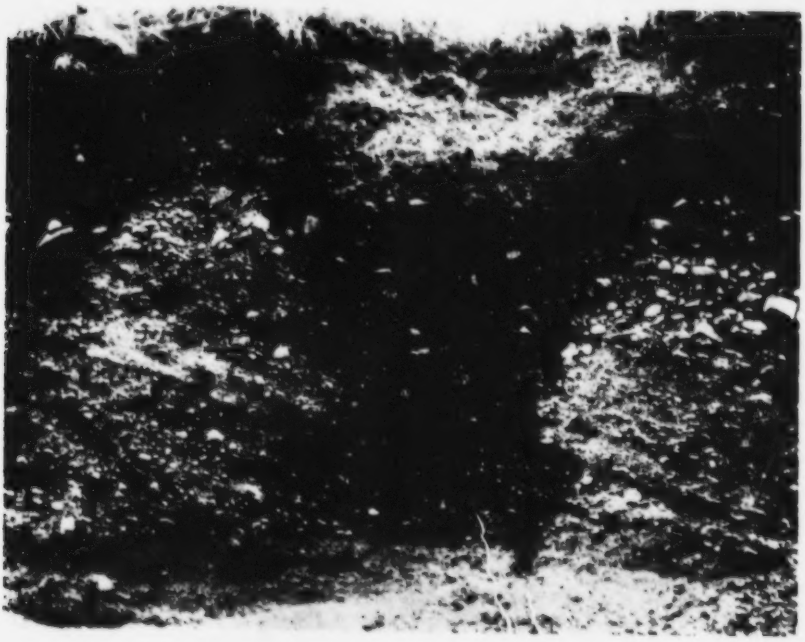
This soil is often low in phosphorus and potassium and these elements can be supplied by means of commercial fertilizers. The reaction of the surface soil is medium acid, and crops such as legumes, would benefit from the use of lime. The need for fertilizers and lime is best determined by a soil test.

Because of the open nature of the soil, it is often droughty and supplemental irrigation may be worthwhile on some crops.

Burford Series

There are no large continuous tracts of Burford soils in Simcoe County. Instead, these soils occur in comparatively small, widely scattered areas in the southern part of the County. They occupy a total of 2,100 acres and are of minor importance in the agricultural economy of this region.

Burford gravelly loam is the type name for these soils. The topography is gently undulating and slopes are smooth. The soil is well drained.



Burford gravelly loam

The soil profile consists of gravelly loam materials resting on stratified gravel. The gravel is derived mainly from limestone and hence is calcareous. The profile has a very dark grey A_1 horizon about 4 inches thick which rests on a yellowish brown A_2 horizon. The A_2 horizon becomes lighter in colour with depth and is slightly to medium acid in reaction. A dark yellowish brown B horizon lies below the A_2 which contains more clay than the layers above or below it. The gravel is light brownish grey in colour and occurs at depths of 20 to 28 inches. The profile is gravelly throughout and large numbers of gravel stones appear on the surface. This gravel does not greatly interfere with the operation of most farm implements, potato diggers being an exception.

The Burford soil is used for such farm enterprises as mixed farming and dairying. Oats, mixed grain, winter wheat, hay and pasture are the main

crops grown and yields vary according to management. For example, yields of spring grain may reach 60 bushels per acre when soil fertility is maintained by applications of adequate amounts of fertilizer and manure. However, when these are omitted from the management practices yields soon drop to 30 to 40 bushels per acre. Most crops respond to applications of phosphorus, and nitrogen may be necessary for some crops.

Crop growth on these soils is not only limited by fertility but are also limited by rainfall. During prolonged dry periods Burford soils soon dry out and the crops suffer.

Sargent Series

The largest areas of Sargent soils are located in Vespra and Oro Townships. These soils occupy 28,300 acres or almost 3 per cent of Simcoe County and may occur as comparatively narrow beaches of old and existing lakes or as part of kame deposits.

In general, the topography is gently undulating. However, where these soils are associated with kame deposits, slopes are short and steep and the topography is steeply rolling. These steeply rolling areas are not common among the Sargent soils and hence have been designated as a steep phase of the Sargent gravelly sandy loam.

These soils have a profile that is characteristic of the Brown Forest soils. The soil profile is thin and often calcareous from top to bottom. The profile has a very dark brown A_1 horizon about 5 inches thick which rests on a dark yellowish brown B horizon. The B horizon shows little or no accumulation of clay and is underlain by pale brown, calcareous gravel. The gravel occurs at depths of 12 to 18 inches. Where this soil occurs adjacent to sand deposits one or two feet of sandy loam occurs on top of the gravel. The resulting profile is Grey-Brown Podzolic and resembles the Caledon sandy loam. These areas are much too small to be shown on the soil map.

The Sargent soils are droughty and low in natural fertility and are used chiefly for pasture. However, fair yields of spring grains can be obtained when the land is adequately fertilized. Steeply rolling areas should be reserved for forestry.

Gwillimbury Series

The soils of the Gwillimbury series occur in widely scattered areas in Simcoe County occupying a total of 2,300 acres. They are of minor importance. They are mapped in association with the Sargent soils and occupy the level, imperfectly drained areas.

The soil development is much like that occurring in the Sargent soils with the exception that mottling occurs in the gravel and in the top of the B horizon. The B horizon of the Gwillimbury soils is slightly lighter in colour than that of the Sargent soils.

Gwillimbury gravelly sandy loam is the type name for the soils mapped in the County. There are a few areas which have a very stony surface. These are called Gwillimbury gravelly sandy loam - stony phase.

The Gwillimbury soils are used mainly for pasture. Low natural fertility and imperfect drainage limit their use for most crops . However, a wider range of crops could be grown, particularly in dry seasons, if the land was adequately fertilized. The land with numerous surface stones should be kept in forest.

Gilford Series

The soils of the Gilford series are the poorly drained associates of the Burford and Sargent soils. They are of minor importance in Simcoe County and occupy only 800 acres. The topography is depressional.

Soil development is characteristic of the Dark Grey Gleysolic soils having a drab grey mottled G horizon present instead of the brownish A_2 and B horizons of the Burford soils. The profile of the Gilford soils has a black A_1 horizon about 8 inches thick which is underlain by a greyish brown, very mottled G horizon. The G horizon becomes slightly lighter in colour with depth and may or may not be calcareous. Pale brown, calcareous gravel occurs at depths of 14 to 26 inches.

Gilford gravelly sandy loam is the only type in the series mapped in Simcoe County. Although most of it has been cleared, it is not cultivated with any regularity and therefore is used chiefly for pasture.

The main problem connected with this soil is one of drainage. This condition is difficult to improve because of the gravelly subsoil and the depressional topography.

Wyevale Series

The soils of the Wyevale series are mainly located in Tay, Flos and Vespra Townships where they occupy 10,600 acres or about 1 per cent of the total land area. These soils were first identified in Simcoe County and up to the present occur only in this County.

The Wyevale soils are stony and have developed from non-calcareous outwash gravel. The topography is gently undulating but may be broken in a few places by a short, abrupt slope. These slopes may mark the boundaries of different terrace levels. The soils are well drained.

Wyevale gravelly sandy loam is the only type included in the series. It has developed a profile characteristic of the Podzols. The profile has a thin, black A_0 horizon composed of raw humus and roots. This is underlain by a very dark greyish brown A_1 horizon about 1 inch thick. The A_1 horizon, although thin, is nearly always present and is strongly acid in reaction. It rests on a thin, light grey A_2 horizon which is the most acid layer in the profile. The B horizon, below the A_2, is yellowish brown and becomes lighter in colour with depth. The gravel occurs at a depth of about 20 inches.

The Wyevale soil is not used for cultivated crops. Instead, large areas are covered with trees and brush. This soil is stony, strongly acid, droughty and of low natural fertility. It would be most difficult to use these soils for crops that require cultivation.

Hendrie Series

The Hendrie soils are the imperfectly drained soils associated with the Wyevale series. They occupy level land areas of which there are 1,400 acres in the County.

The soil development is characteristic of the Podzol Great Soil Group but, since the lower part of the profile is wet for a part of the year, mottling is present. The profile is much like that of the Wyevale soils having a thin, black A_0 horizon which is underlain by a very dark greyish brown A_1 horizon about 2 inches thick. The A_2 horizon is light grey and a little thicker than that of the Wyevale soils. The B horizon is yellowish brown and contains many reddish brown mottles. It is underlain by grey, non-calcareous gravel which occurs at depths of 20 to 24 inches.

The Hendrie soils are non-agricultural because of their low natural fertility, stoniness and imperfect drainage. They should be used for forestry.

Dundonald Series

The Dundonald soils occur in fairly large areas in many parts of Central Ontario. They have been recognized in York, Ontario, Victoria, Durham and Northumberland Counties as well as in Simcoe. In Simcoe County 17,000 acres have been mapped and most of these occur in Innisfil and Essa Townships. Two soil types namely, sandy loam and fine sandy loam, have been included in the Dundonald series.

The Dundonald soils are developed in sandy outwash materials overlaying calcareous loam or sandy loam till. They are well drained and have gently to moderately rolling topography. The soil development is characteristic of the Grey-Brown Podzolic Great Soil Group. The profile has a dark greyish brown A_1 horizon about 3 inches thick which rests on a yellowish brown A_2 horizon. The A_2 horizon is medium acid in reaction and becomes lighter in colour with depth. Below the A_2 is a brown B horizon which contains more clay than the layers above it. The B horizon usually rests directly on grey calcareous loam or sandy loam till. However, in some places a layer of dark yellowish brown clay or clay loam occurs between the B and the underlying till. There is considerable variation in the depth of the sandy overburden which ranges from 18 to 34 inches.

Most of the land has been cleared except for woodlots in which beech and maple are the dominant species. These soils are used chiefly for mixed farming and such crops as oats, mixed grains, hay and pasture are the main ones grown. However, in a few selected areas specialized crops such as fruits and vegetables are grown.

The soils are low in phosphorus and crops respond to applications of this element. Certain crops will also respond to applications of potassium and nitrogen. For example, potassium is usually required for fruit and vegetable crops and nitrogen is needed for corn. The Dundonald soils can be used for tobacco but in some places the nitrogen content is too high, slowing the crop's maturity. Care should be taken to keep the soil under vegetative cover as much as possible to prevent the loss of soil by wind erosion.

Edenvale Series

The soils of the Edenvale series are imperfectly drained and commonly occur in association with the Dundonald soils. They were first mapped in the vicinity of Edenvale in Simcoe County with a total area of 2,600 acres.

The topography is very gently undulating. Like the Dundonald soils, these soils have developed from sandy outwash materials underlain by loam or sandy loam till. Only one type, sandy loam, is included in the series and it is characteristic of the imperfectly drained Grey-Brown Podzolic soils. The profile has a very dark greyish brown A_1 horizon about 4 inches thick and medium acid in reaction. This horizon is underlain by an olive-yellow A_2 horizon which in turn rests on a somewhat darker coloured B horizon. The B horizon contains more clay than the layers about it and both this layer and the lower part of the A_2 horizon are mottled. The B horizon rests directly on calcareous grey loam or sandy loam till which occurs at a depth of about 20 inches.

The best crop yields are obtained on the Edenvale soil during dry seasons when the additional moisture present is of value to the growing crop. In most seasons it is slow to warm up and cultivation may be delayed. The soil is used mainly for mixed farming and crops such as oats, hay and pasture are grown. Crops grown on this soil will respond to applications of a complete fertilizer mixture. The kind and amount of fertilizer to be used is best determined by a soil test.

Bookton Series

The Bookton soils are located mainly in South Simcoe where 12,100 acres are mapped. Both sandy loam and fine sandy loam types are included in the series. The soils are developed from sands overlying clay. The topography is gently rolling and the drainage is good.

These soils are characteristic of the Grey-Brown Podzolic Great Soil Group. The depth of sand over the clay is variable but usually is between 18 and 30 inches deep. The profile has a dark grey A_1 horizon about 3 inches thick. It rests on a yellowish brown A_2 horizon which is usually quite thick, about 20 inches. The A_2 horizon becomes lighter in colour with depth and rests on a somewhat darker coloured B horizon. The B contains more clay than the layers above it although it is a sandy loam texture. In some places the B has developed in the clay materials and only the A horizons are formed in the sand. The underlying clay is light brownish grey in colour and calcareous.

The Bookton soils are used mainly for mixed farming in Simcoe County. There are a few small areas in the neighbourhood of Collingwood which are producing good vegetable and fruit crops wherever the underlying clay does not interfere with root growth. Even when the clay is three feet away from the surface some fruit trees, especially cherries, fail to produce, or after a few years of production wither and die. This happens because the impermeable clay keeps too much water in the root zone. In any case, the soil is suited to the growing of many small fruits and vegetables and also produces medium yields of hay, pasture and grain.

Most crops respond to applications of phosphorus, potassium and nitrogen and organic matter in the form of barnyard or green manures are required to maintain a satisfactory granular structure. The Bookton soils are stone-free, early and easy to work.

Berrien Series

The soils of the Berrien series have developed from sand underlain by calcareous clay. They are the imperfectly drained associates of the Bookton soils and are found on very gently undulating topography. A total of 3,600 acres have been mapped in the County. These soils are spread through Southern Ontario and have been recognized in almost every county in that region.

They are characteristic of the imperfectly drained Grey-Brown Podzolic soils and the profile has a very dark brown A_1 horizon, a mottled A_2 horizon and a mottled B horizon which contains more clay than the layers above it. The B horizon rests directly on the clay and in some places may be developed in the clay.

Wauseon sandy loam. The clay occurs at an average depth of 24 inches

Because of imperfect drainage, the Berrien soils are not suited to growing as wide a range of crops as the Bookton soils. The drainage of the Berrien soils could be improved by the installation of artificial drains. However, the installation of tile is difficult because of the underlying clay and the variation in depth of the sandy materials. These are used for mixed farming and hay and pasture are the main crops grown. They can be used for those species of fruits and vegetables which are not affected by wet soil conditions.

The Berrien soils are low in phosphorus and potassium and therefore fertilizers providing these elements are required for good crop growth.

Wauseon Series

The soils of the Wauseon series are the poorly drained members of the Bookton catena and are usually found in depressional areas where shallow deposits of sand overlie calcareous clay. Like the Berrien soils these are found in many of the counties of Southern Ontario. Two soil types, sandy loam and fine sandy loam have been mapped in Simcoe County where they occupy a total of 3,000 acres.

These soils occupy the slightly depressional areas surrounded by more rolling soils and are therefore the catch basins for the water and eroded soil that runs down from the adjoining slopes. Since these areas are saturated with water for a large part of the year, they tend to develop a deep, dark surface high in organic materials. The subsoil is grey and mottled and lacks the horizon development characteristic of the better drained soils. These soils are classified as Dark Grey Gleysolic. The profile has a very dark brown to black A_1 horizon about 8 inches thick which is underlain by a mottled, greyish G horizon. The G horizon shows no evidence of clay accumulation and rests on calcareous clay. The clay occurs at depths of 18 to 30 inches.

Under their present drainage conditions, Wauseon soils do not produce satisfactory yields of most farm crops. Where they are cleared, they are used for pasture. However, many areas remain in woodland. Drainage improvement is difficult because of the depressional nature of the topography. These soils are better used for pasture or woodland.

Percy Series

The soils of the Percy series have developed from fine sand materials. They occupy a total of 1,900 acres in the County and because of this small acreage are relatively unimportant. However, they do occupy large acreages in other counties, especially Durham, Northumberland and York.

The soils are found on gently rolling topography and they are well drained. Fine sandy loam is the only type mapped but in a few areas it was necessary to map a stony phase of the type because of the presence of numerous stones on the surface of what is commonly a stonefree soil. The soil development is characteristic of the Grey-Brown Podzolic Great Soil Group.

The profile has a dark greyish brown A_1 horizon which is about 3 inches thick in undisturbed locations. Underlying the A_1 is a yellowish brown A_2 horizon which becomes lighter in colour with depth. This horizon is slightly

to medium acid in reaction and rests on a dark yellowish brown B horizon. The B horizon is neutral in reaction and contains more clay than the layers above or below it. Pale brown calcareous fine sand materials occur at depths of 24 to 30 inches.

Percy fine sandy loam is an easily worked soil which warms up early in the spring. It is fairly well supplied with plant nutrients and is well suited to growing a wide range of crops. It is used for mixed farming and a certain amount of cash cropping. Potatoes, winter wheat and other vegetables are the main cash crops grown, whereas oats, hay, pasture and silage corn are used in the mixed farming enterprise. The kind of crop grown is determined largely by the climate of the area in which this soil is located.

Percy fine sandy loam - stony phase is used chiefly for rough pasture because the stones seriously interfere with cultivation. Removal of the stones would make this soil as good as the Percy fine sandy loam. However, it is doubtful that such an improvement would be worthwhile at the present time.

A Profile of Percy fine sandy loam

These soils are medium to low in phosphorus and potassium and crops will respond to applications of fertilizer. The maintenance of organic matter is also important for successful production and the crops benefit from heavy applications of manure.

Medonte Series

The soils of the Medonte series occur chiefly in Medonte and Orillia Townships where 5,400 acres have been mapped. These soils occur as comparatively small areas scattered over the more northerly parts of the above two townships.

The Medonte soils have developed from non-calcareous, varved silt loam and clay. Two types namely silty clay loam and silt loam are included in the series. The topography is moderately rolling and slopes are short and complex. The water runoff over the rolling surface is rapid and percolation through the somewhat impermeable materials is low. These soils are well drained and stonefree.

Soil development is characteristic of the Grey-Brown Podzolic soils. The profile has a dark grey A_1 horizon which, under virgin conditions, is about 2 inches thick. A greyish brown A_2 horizon which becomes lighter in colour with depth underlies the A_1. The upper, darker coloured part of the A_2 is much thinner than that of many other Grey-Brown Podzolic soils and in some places may be absent. Underlying the A_2 is the AB horizon having characteristics common to both A and B layers. Here the grey materials from the A_2 horizon occur on the outside of the aggregates of the B. The AB horizon is pale brown in colour and rests on the B horizon. The B horizon contains more clay than the layers above it and it becomes lighter in colour with depth. The parent materials, which occur at depths of 24 to 36 inches, are varved, non-calcareous silt loam and clay.

The Medonte soils are used for mixed farming and such crops as oats, mixed grains, hay and pasture are grown. Cash crops are not grown because of the fine texture, rolling topography, susceptibility to erosion of these soils and the cool climate that occurs where they are located. However, yields of general farm crops are high when the soils are well managed.

Medonte soils are fairly well supplied with plant nutrients, although crops will respond to additions of nitrogen. The soils will remain in better tilth if liberal amounts of barnyard manure and other organic residues are frequently incorporated with the soil.

Lovering Series

The soils of the Lovering series occupy a total of 18,100 acres in the Townships of Matchedash, Orillia, Medonte, Tiny and Flos. Two soil types, clay and silty clay loam, are included in the series. In a few small areas these types have numerous stones on the surface. These areas have been designated as stony phases in order to separate them from the normally stonefree soils.

The topography is very gently to gently undulating with long smooth slopes which result in imperfect drainage conditions within the soil profiles.

The profiles are characteristic of the imperfectly drained Grey-Brown Podzolic soils. The profile has a very dark grey A_1 horizon about 6 inches thick which rests on a mottled, light brownish grey A_2 horizon. The A_2 horizon is thin and may be absent in cultivated areas where it has been mixed

Lovering clay. The soil aggregates are coarse in the B horizon

with the A_1 horizon. A mottled, pale brown AB horizon underlies the A_2 and rests on a mottled greyish brown B horizon. The B horizon becomes lighter in colour with depth and contains more clay than the layers above it. The varved silt loam and clay parent material occurs at depths of 18 to 30 inches. Although this material has a neutral to slightly alkaline reaction, it is non-calcareous at depths up to 48 inches. Horizon differentiation shows up best in these soils when they are moist. When wet, the colour of the A_2 appears much the same as that of the B and when dry all horizons are masked by an overall light grey colour.

The Lovering soils are capable of producing good crops of hay, spring grains and pasture and they are used for mixed farming. They are often difficult to work but the physical condition can be improved by incorporating liberal amounts of barnyard manure and other organic residues with the soil.

The cultivation of the land and the harvesting of the crop are often delayed after heavy rains. Therefore, it is desirable to install ditches or tile drains to remove excess water.

Atherley Series

This series occurs in Medonte and Orillia Townships, the largest areas being between Coldwater and the North River. A total of 13,500 acres have been mapped in the County.

The Atherley soils usually occupy the depressions or level lands surrounded by soils of greater relief. They therefore act as catch basins for the water

Profile of Atherley clay

and eroded soil that runs down from the surrounding slopes. The surface texture is chiefly clay or silty clay loam but there are small areas of silt loam that have not been differentiated. The silt loam texture is due to a surface deposit of silty materials washed down from adjacent slopes. These soils are commonly stonefree but 1,500 acres have been mapped as a stony

phase where surface stones are sufficiently plentiful to make cultivation very difficult.

The Atherley soils are derived from non-calcareous, varved silt loam and clay. In Simcoe County these materials are comparatively thin and are often underlain by limestone bedrock at depths of 6 to 10 feet. The varved materials are slowly pervious to water.

The soils of the series are poorly drained and they remain saturated for long periods of the year. Because of this saturation, they tend to develop a deep, dark surface and a grey mottled subsoil which lacks the horizon development characteristic of the better drained soils. They are classified as Dark Grey Gleysolic. The profile has a very dark, greyish brown A_1 horizon about 8 inches thick which is underlain by a very mottled grey G horizon. The G horizon becomes somewhat lighter with depth. The massive structure in the lower part of the G tends to decrease water movement to a minimum. The parent materials occur at depths of 26 to 30 inches and are nearly always moist. The upper part of these soils is slightly to medium acid in reaction but the reaction approaches neutrality with increased depth.

Most of the Atherley series is cleared and is used for growing hay and pasture. One of the main difficulties with developing the land for a wider range of crops is the high cost of draining. It also is difficult to find a suitable outlet for some of the areas. However, when the season is more or less dry, a greater variety of crops can be grown. In the areas southeast of Coldwater, fair crops of grain were observed and in a few instances good crops of silage corn are being grown. In its present condition, the land is most suitable for hay, pasture and, to a lesser extent, spring grain.

In addition to draining, manures and rotations are the best way of improving these soils for agriculture. The natural fertility of the soils is high but manures and rotations are required to keep the soil as open and friable as possible. Lime may be required in some fields.

Schomberg Series

The soils of the Schomberg series are mainly located in Tecumseth and West Gwillimbury and occur in what was the bed of an old glacial lake known as "Schomberg". These soils occupy 50,800 acres or almost 5 per cent of the total land area in Simcoe County. They also occur in York and Ontario Counties.

The Schomberg soils are developed from deep deposits of stratified clay and silt loam. The material under the clay is that of a drumlinized till plain. The smaller drumlins are completely covered but many of the larger ones escaped complete burial although the clay may occur well up the slopes of the hills. For example, the large drumlin on which the village of Bondhead is located has clay within a very few feet of the top. The average depth of the clay deposit is about 15 feet, but much deeper deposits are known. Since the rolling relief of the underlying till plain has not been entirely eliminated, these areas are not so flat as many lake plains. In addition, considerable dissection by old and more recent streams has taken place. As a result, the topography varies from moderately to steeply rolling and

slopes are short. Although most of these soils are moderately rolling, about 300 acres are delineated as steep phase because of their rough topography.

The Schomberg sediments are typically varved clays with individual layers of two, three, four or more inches in thickness. The summer layer makes up three-quarters to four-fifths of the thickness, contains more silt and is

Schomberg silty clay loam. Note the varved parent materials

grey in colour. The winter layer contains more clay and is greyish brown. Both portions of the varve are decidedly calcareous and small fossil shells are sometimes found in them. Chemical analysis shows the clay to contain about 50 per cent of calcium and magnesium carbonates. Mechanical analysis indicated about 50 per cent of clay and 40 per cent of silt in these materials.

The soils of the Schomberg series are well drained. Surface texture varies from silt loam to silty clay loam, with the majority occurring in the silty clay loam class. All of the Schomberg soils in Simcoe County are stone-free except for a few areas amounting to 600 acres mapped as a stony phase.

Soil development is characteristic of the Grey-Brown Podzolic soils. The profile has a very dark brown A_1 horizon about 3 inches thick which is underlain by a light yellowish brown A_2 horizon. The A_2 horizon rests on a dark brown B horizon which contains more clay than the layers above it. The parent material occurs at depths of 20 to 30 inches. Variations in the number of horizons and the thickness of profile are due mainly to erosion. On the steeper slopes of cultivated fields, the A horizon is missing and the B horizon is being used for the cultivated surface. In many cultivated areas, the A_2 horizon has been more or less mixed with the A_1 to form a new surface layer and therefore is thin or absent. Free carbonates are often present in the ploughed layer of the cultivated soil.

The Schomberg soils are among the best fine textured soils in the Province. These soils have been thoroughly cleared and little forest cover remains. Mixed farming is the rule, with a dominance of grain on the cropland. There is a greater concentration of winter wheat in the area of Tecumseth and West Gwillimbury than in any other locality except the clay plains of Kent and Essex. Oats and barley are plentiful, also being used largely as feed for hogs and cattle. Dairying is common and large acreages are devoted to hay and pasture crops to provide forage for the dairy herds.

Crop yields are medium to high, varying with differences in soil management. Average yields of some of the common crops are as follows: winter wheat, 50 bushels per acre; oats, 75 bushels per acre; and hay, 2½ tons per acre. Soil erosion, as has been mentioned before, is a problem on these soils. The beginning of erosion is indicated by light coloured surface patches on the knolls. Soil losses can be reduced by keeping the land under cover as much as possible, by using crop rotations, by ploughing across the slope rather than up and down and by certain special practices such as contour cultivation, strip cropping and the making of grassed waterways where applicable.

Smithfield Series

The Smithfield soils occupy 27,000 acres or about 2½ per cent of the total land area and are developed from the same materials as the Schomberg soils. They are found in the Townships of Adjala, Tecumseth, Flos, West Gwillimbury, Innisfil, Essa, Tosorontio, Vespra and Sunnidale. Except for one or two large areas in Flos and Tecumseth Townships, most areas are comparatively small and widely scattered throughout the more southerly parts of the County.

The Smithfield soils are found in the low lying land between the swells of the Schomberg soils and near present-day streams. The topography is gently undulating and the drainage is imperfect. Silty clay loam is by far the dominant surface texture, although some silt loam also occurs. The soils are stonefree and erosion is little or no problem.

The soil profile is characteristic of the imperfectly drained Grey-Brown Podzolic soils and has a dark coloured A_1 horizon about 5 inches thick. The A_2 horizon is thin, mottled and light yellowish brown in colour. It is underlain by a mottled brown B horizon which contains more clay than the layers above or below it. The varved parent material usually occurs at a depth of about 20 inches. Both the parent material and the B horizon are calcareous and in some places free carbonates occur in the A horizons.

Barley yields are high on drained Smithfield silty clay loam

In the undrained state, Smithfield soils are used for growing spring grains, hay and pasture. However, when drainage systems are installed these soils are used in growing the same crops as the Schomberg soils and are managed in a similar way. Tile drains have been installed in many of the fields, since there is invariably plenty of slope so that the drains will work efficiently. Mixed farming and dairying are the main farm enterprises conducted on these soils.

The soils are low in phosphorus and fertilizers high in this element are required for most crops. Frequent applications of manure are necessary to keep the soil in a good state of tilth.

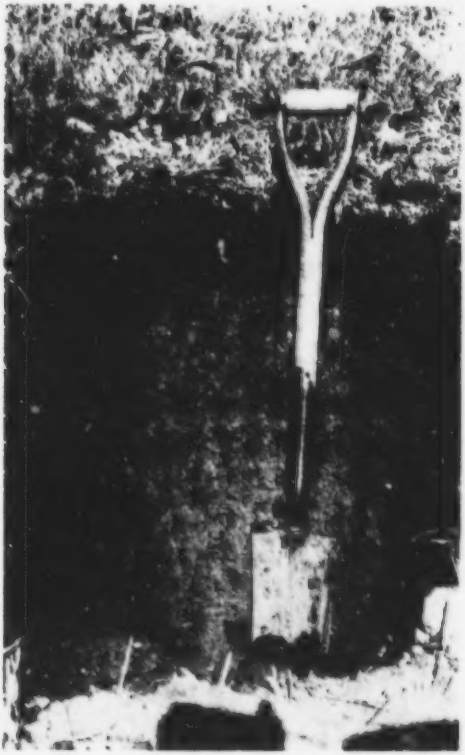
Simcoe Series

The soils of the Simcoe series are the poorly drained members of the Schomberg catena and are commonly found in association with the Schomberg and Smithfield soils. They occupy the level and slightly depressional areas. A total of 7,100 acres have been mapped. The surface texture ranges from silt loam to silty clay loam and 3,900 acres of silt loam and 3,200 acres of silty clay loam have been mapped. Except for 100 acres of land with considerable stone on the surface, the soils are stonefree. This is differentiated as Simcoe silty clay loam - stony phase.

Soil development is characteristic of the Dark Grey Gleysolic soils. The profile has a very dark brown A_1 horizon about 6 inches thick. The G horizon is mottled, greyish brown in colour and becomes lighter in colour

with depth. The calcareous, varved parent material occurs at depths of 20 to 30 inches. The profile is commonly calcareous within 12 inches of the surface but free carbonates may be present in the cultivated layer.

Although these are poorly drained soils, it should be recognized that they are potentially good for agriculture. Some system of artificial drainage is required to bring them into a higher state of production. Some of the larger areas have been tiled and are used for growing spring grain, hay and pasture. Undrained areas are often in woodlot or natural pasture. They can be used



Simcoe silty clay loam. The thick dark surface and drab grey subsoil are characteristic of the Dark Grey Gleysolic soils

for the production of high quality grass sod to be used for lanscaping purposes. One or two such areas exist in the southern part of the County.

Both dairying and mixed farming occur on these soils. When the need for greater production becomes pressing, the Simcoe soils should be considered as potential areas of development.

Minesing Series

The soils of the Minesing series occupy 15,100 acres in the County. The largest areas of these soils occur in the vicinity of the Nottawasaga River in the Townships of Sunnidale and Vespra. A few somewhat smaller areas are present at and near Marl Lake in Flos Township.

The Minesing soils have developed from varved clay and silt loam with a high content of marl. Apparently the water from which the fine mineral materials were deposited was sufficiently high in lime to support lime-excreting animals. The marl deposited by these animals accumulated with the clays and silts. At one time three deposits covered the areas now mapped

Muck overlies the marl in uncultivated areas of the Minesing swamp

as Minesing. On top was a layer of muck of variable thickness. Underneath this was a relatively thin layer of more or less pure marl followed by the varved, marly clay and silt loam. When the land was cleared for cultivation, the muck was burned off, leaving the underlying marl and clays to be cultivated. The original layers of the various materials can still be seen in the undisturbed portion of the Minesing Swamp.

The topography of these soils is level to depressional and the drainage is poor. Surface textures vary from silty clay loam to clay. Of these, the Minesing clay with a total of 10,900 acres is dominant. The soils are stonefree and calcareous throughout. The strongly alkaline reaction of the soil and the abundance of carbonates is due to the high content of marl.

The classification of these soils is somewhat difficult. In the past and indeed on the map which accompanies this report, they have been included in the Dark Grey Gleysolic Great Soil Group. However, since they do not have a deep, dark A_1 horizon and since development may be retarded by the high lime content, it would seem that these soils are more characteristic of the Gleysols. The soil profile has a grey cultivated layer about 7 inches deep which, when dry, is almost white. This is underlain by a very mottled, light brownish grey marly horizon which rests on the marly varved silt loam and clay. Numerous shells and marl are concentrated in the upper 10 inches of the profile. Areas of Minesing soil adjacent to areas of sand are often underlain by sand. The sand may occur within 14 inches of the surface but is usually at 24 inches. The underlying sand also has a high marl content.

The marl in the soil keeps it open and very friable. In spite of the fact that these soils are poorly drained, water soon drains away from the surface. As a result, the soils are ready for cultivation earlier than the poorly drained clays located farther south.

These soils are used mainly for mixed farming and spring grains, hay and pasture are the chief crops grown. Clovers such as red clover and birdsfoot trefoil are grown for forage and occasionally harvested for seed. Mixed farming is most common and, therefore, emphasis is placed on the growing of forage crops.

Although these soils are high in potassium, there is not sufficient phosphorus available for plant growth. Most crops respond to applications of phosphorus, and nitrogen is required for crops such as corn. Drainage improvement by the installation of tile drains or ditches would make it possible to grow a wider range of crops.

Bennington Series

The Bennington soils occur in Tosorontio and Essa Townships where they occupy a total of 9,400 acres. The largest area is located a few miles north of Alliston around the Camp Borden road.

In general, they have a moderately rolling topography but steep slopes occur in some places. The steepest slopes occur on the perimeter of the large area north of Alliston. There is little variation in surface texture. Although some small pockets of silt loam are present, only fine sandy loam has been mapped. The soil is well drained and stonefree.

The soil is developed from fine sandy loam materials underlain by clay at depths of 3 feet or less. Profile development is characteristic of the Grey-Brown Podzolic soils. The profile has a dark grey A_1 horizon about 3 inches thick which is underlain by a yellowish brown A_2 horizon. The A_2 horizon becomes lighter in colour with depth and rests on a dark brown B horizon.

The B horizon contains more clay than the layers above it and rests directly on the light brown clay D horizon. In all cases, the profile above the clay is weathered and the original parent material cannot be found. The clay occurs at depths of 20 to 34 inches.

The Bennington soil is used for mixed farming and dairying. Oats, mixed grains, winter wheat, hay, pasture and silage corn are the main crops grown. Potatoes do well on this soil and yields are good when adequate amounts of fertilizer are used. Yields of all the crops commonly grown in this region are good, especially when fertilizers high in phosphorus are added to the soil.

The soil is susceptible to erosion and good farm management requires the use of practices which will prevent or reduce soil loss. Soil losses are already high on the steep slopes and these should be kept under grass cover as much as possible. The Bennington soil is one of the best agricultural soils in the County.

Farmington Series

The Farmington soils are shallow and have developed from calcitic till which is less than one foot deep. In some areas, limestone bedrock appears at the surface and the soil materials can only be found in the crevasses of the rocks. These soils occupy a total area of 9,600 acres or almost 1 per cent of the County. They are found mainly in Matchedash Township.

The topography is level except where it is interrupted by rocky ledges. These ledges are very abrupt and form perpendicular ridges. The soils are well drained and are droughty during the summer months because there is insufficient moisture reserve due to shallowness.

Within the areas mapped as Farmington are small areas of somewhat deeper soils and soils of poorer drainage. The deeper soils rarely exceed a depth of 15 inches and have developed from the same calcareous till as the Farmington soils. They commonly have a weakly developed subsurface horizon between the surface and subsoil layers described for the Farmington soils. These deeper soils and soils of poorer drainage occur to such a small extent that they cannot be separated except on a much more detailed survey.

The profile of the Farmington soils varies. In very shallow soils there is seldom more than a thin organic layer over the bedrock but where the soil is more than 4 inches deep the dominant horizon is a brown to dark brown subsoil layer just below the surface soil. The parent material is a calcareous, stony loam. This kind of soil development may be considered to be Brown Forest.

Forestry and grazing are the two principal uses of this soil. Cedar vegetation is common where the soil is only a few inches in depth. In the deeper crevasses, hard maple grows very well. In the virgin forest, maple was doubtless the dominant tree species on the shallow limestone plains. However, it appears to be very difficult to re-establish tree cover on the thin soils.

Large areas of land are used for grazing. The grazing of livestock on this land appears to provide the farmer with a living, providing there is sufficient acreage. For crop production this soil must be considered a marginal type. Lack of moisture reduces the efficiency of methods of improving soil fertility which have proven economical on other types. However, clovers can be grown with fair success in seasons with adequate rainfall. By growing clovers frequently and using all available farmyard manure and crop residues, a fair state of fertility can be maintained. Liming is not necessary.

Muck

The Muck soils occupy 60,600 acres or almost 6 per cent of the total land area in Simcoe County. They occur in all of the counties and districts in the Province and, in Simcoe County, areas of variable size are present in all townships.

Muck soils are most commonly found in depressions within upland areas, where water tends to collect. Consequently, they are saturated with water at all times and may be completely inundated at certain periods of the year. This wetness promotes the accumulation of organic debris. Therefore, Muck soils consist of partially decomposed organic materials which have accumulated over a considerable length of time.

The profile of the Muck soil does not exhibit the horizon differentiation that is typical of the mineral soils. Instead, there are alternating layers of decomposed material which vary slightly in colour, decomposition and the kind of plant remains. The colour varies from black to dark brown. These layers of organic remains range in thickness from 12 inches to several feet and rest on sand, silt, clay or rock. In Simcoe County the average thickness of the organic material is 5 feet. The surface material has a neutral reaction and the profile is stonefree.

For the most part, the Muck soils are covered by forest and the vegetation consists mainly of elm, ash, white cedar and sedges, the latter being the dominant herbaceous plant. At present, such areas are serving a useful purpose as water and wildlife reservoirs. Many Muck areas have a high potential for the production of market garden crops. However, before they can be successfully used for this purpose, a great deal of development is necessary. Such development will include the clearing of trees and bush, the installation of drains and irrigation equipment and the application of phosphatic and potassic fertilizers.

The Bradford Marsh, half of which is in West Gwillimbury Township bordering the Schomberg River, is a good example of what can be done with Muck soil to make it productive for vegetable crops. Prior to reclamation, this area was similar to the undeveloped muck areas of today with the possible exception that there were fewer big trees. In 1925, drainage operations were started. A canal 17½ miles long and 7 feet deep was dredged around the entire Marsh. All the natural drainage from the headwaters of the Schomberg River and adjoining watersheds is caught by this canal and carried around and past the Marsh. The earth from the canal was thrown up to form a dike wide enough for a roadbed. Open ditches were dug in order to drain the water from the land inside the dikes. Across the narrows and connecting the dikes, a dam 450 feet long was constructed to hold back the waters of Lake Simcoe. Pumps were installed on the dam to pump the water from the river into the main canal and these now control the water

level in wet seasons. In dry seasons the Marsh is irrigated by pumping or siphoning water into the ditches from the drainage canal.

Muck is low to very low in phosphorus, potassium, copper, boron and manganese. These nutrients must be supplied by heavy applications of commercial fertilizer. Applications of nitrogen vary according to the stage of decomposition of the organic material and the requirements of the crop grown.

Besides the need for drainage, irrigation and fertilizer, the owner is faced with other management problems. There is the danger of flooding which causes the sponge-like Muck to float away. When burning piles of roots, fire in the Muck is a danger. Fires in muck land rapidly spread underground and are extremely difficult to check.

Properly developed muck lands produce good crops of onions, lettuce, celery, carrots, potatoes and other vegetable crops. However, until population and markets increase, it is unlikely that a large scale development of muck lands is required. Before such development takes place, its effect on the water supply and wildlife should be carefully studied.

Profile of a muck soil

Bottom Land

Low lying soils adjoining stream courses and subject to flooding are designated as Bottom Land. These soils occupy 4,900 acres in the County. They are immature soils showing none of the horizon differentiation common to other mineral soils. The profile commonly consists of layers of sand, silt or gravel which are grey in colour except when organic material has been mixed with them, in which case, the layer is dark in colour. The drainage varies from imperfect to poor but is usually poor.

Bottom Land is used largely for pasture.

Marsh

Areas that are covered by water for the entire year are mapped and designated as Marsh. These areas, occupying 2,800 acres, are covered by water-loving plants such as cattails and sedges and by scrub vegetation, the chief of which is willow. The soil surface may consist of sand, clay or thin muck deposits. These areas are unsuitable for agricultural purposes.

Eastport Series

The Eastport series consists of one type, the sand, and it occurs along parts of the shore of Nottawasaga Bay. Here it occurs in the form of dunes and the topography is rough and slopes are often short and steep. The soil is rapidly drained, with small depressional areas of poor drainage being present. Vegetative cover is scanty but where it is present, it consists mainly of pine, poplar and some white birch.

There is practically no horizon development in the profile. In most cases, the profile consists simply of a grey calcareous sand. Where the sand has been stabilized by vegetation, the profile has a thin organic layer underlain by a pale yellow horizon which in turn rests on the grey sand.

This sand is subject to wind erosion and has no value as agricultural land. It is used for recreational purposes and as building sites for summer cottages.

Rock

Areas of bare rock with little or no soil cover have been designated as Rock. Rock occupies 1,100 acres and most of it is found in Matchedash Township. It has no agricultural value.

Soil Complexes

Soil complexes are mapping units that represent a combination of two or more soil types that cannot be separated individually on a soil map. In naming each complexed area, the names of the two dominant types are used. Thus, an area in which Simcoe silty clay loam and Berrien sandy loam were dominant would be called Simcoe silty clay loam — Berrien sandy loam. In each case, the soil mentioned first occupies the largest acreage. Soils other than those mentioned in the soil complex may occur. These are com-

monly of little importance because they occupy such a small part of the soil complex. However, if these soils are an important part of the complex, their names can be added to those identifying the complex. Actually, almost all soil areas shown on a soil map of a scale of 1 inch to the mile contain other soils in addition to the soil type mapped. Where these additional soils occupy less than 15 per cent of any mapped area, only the dominant soil type is used to identify that area. Therefore, an area shown on the map as Bondhead sandy loam may only contain 90 per cent of that soil type. The remaining 10 per cent may be made up of the other catenary members Guerin sandy loam, and Lyons sandy loam or other unrelated types.

There are a number of places in Simcoe County where different soils occurred in such close association that they could not be separated from one another. These areas are shown on the soil map as complexes and are described as follows:

Rock - Atherley clay

The soils of the Rock - Atherley clay complex occur in Matchedash and Orillia Townships where they occupy 67,100 acres or almost 6.5 per cent of the total land area in the County. This complex is made up wholly of rock outcrop and Atherley clay, both of which have been described previously in this report. The topography is generally rough and interspersed with occasional stretches of flat land. The clay occupies the flats between the rocks and is wet for a large part of the year.

These areas are used chiefly for pasture. The rock has a very scanty vegetation cover whereas the clay does provide a certain amount of grass. However, the clay areas are commonly small. Areas consisting of this complex should be reforested.

Atherley clay - Rock

Areas of the Atherley clay - Rock complex occupy 7,900 acres in Matchedash and Orillia Townships. They consist of flat clay plains broken by frequent outcrops of rock of Precambrian age which are comparatively small in size.

This complex is used for mixed farming and oats, hay and pasture are grown on the Atherley clay. Most of the clay land is used for growing hay and pasture, since it is often too wet for cultivation. The rock occurs frequently enough to interfere with the cultivation of many fields.

Medonte silty clay loam - Rock

The Medonte silty clay loam - Rock complex is composed of about 70 per cent Medonte silty clay loam and 30 per cent rock. The complex occupies 800 acres in Orillia Township. The topography is rolling to hilly and slopes are short and steep.

Cultivation is carried on between the various outcroppings of rock and spring grain, hay and pasture are grown. These areas are used for mixed farming. Further information with regard to the individual components of this complex can be found on previous pages of this report.

Smithfield silty clay loam - Berrien sandy loam

In some parts of Sunnidale Township, the smooth gently undulating silty clay loam soils are intermittently covered by a thin layer of sand. These areas consist of about 70 per cent Smithfield silty clay loam, 20 per cent Berrien sandy loam, 3 per cent Wauseon sandy loam and 2 per cent Bookton sandy loam.

The well drained Bookton sandy loam occurs on the top of the sandy knolls. The surface texture of this complex varies from silty clay loam to sandy loam and, although most of each area is imperfectly drained, small acreages of well and poorly drained soils are present. These variations in surface texture and drainage over short distances make management difficult, since different kinds and amounts of fertilizer are often required for different kinds of soil. As a result, when fields located within this complex are fertilized, it is usually with a fertilizer mix which may be ideal for one soil condition but not for all which may occur in the one field. In general, the soil characteristics change often from one part of the field to another making changes in fertility practices almost impossible. This does not mean that fertilizers should not be used in these areas. Instead, great care should be taken in sampling and testing the field so that an adequate fertility program can be conducted.

These areas are used for mixed farming and such crops as oats, mixed grain, hay, pasture and silage corn are grown. Yields are medium and possibly could be improved by adding a base fertilizer mix to the whole field, followed by additional fertilizer, if required, on the less fertile sandy knolls. The amounts and kinds of fertilizer to be used are best determined by a soil test.

Simcoe silty clay loam - Berrien sandy loam

This complex is made up chiefly of level stretches of Simcoe silty clay loam and knolls of Berrien sandy loam. These individual types occupy approximately 75 per cent and 20 per cent respectively of each mapped area. The remaining 5 per cent of each area is Wauseon sandy loam. The complex occurs mainly in Sunnidale Township and occupies 4,100 acres in the County.

Surface texture within a given field varies from silty clay loam to sandy loam. Areas mapped in this complex are used mainly for hay and pasture. Silage corn and spring grains are grown when reasonably dry weather permits the cultivation of the land.

Because there is a wide range in texture over the fields within the complex it is often difficult to work out a good fertility program.

Parkhill loam - Edenvale sandy loam

The Parkhill loam - Edenvale sandy loam complex occupies 4,900 acres in Nottawasaga and Sunnidale Townships. The very gently undulating loam soil of the Parkhill series occupies about 75 per cent of each area. Associated with this soil are comparatively small knolls of Edenvale sandy

loam which occupy the remaining 25 per cent of each area. These areas are wet for a large part of each year and the crops to be grown on these areas would benefit from improved drainage. They are used for mixed farming and hay and pasture are the main crops grown. Because the range in texture over the fields within the complex is not great, it is not too difficult to work out a good fertility program.

Osprey loam - Dunedin clay

The Osprey loam - Dunedin clay complex occupies the steeply rolling land occurring near the Niagara Escarpment in Nottawasaga Township. The Osprey loam occurs at the tops of the hills and the Dunedin clay is found on the slopes below. A total of 23,700 acres were mapped.

Most of the complex, or about 70 per cent, is composed of Osprey loam. The rest of it is made up of Dunedin clay except for a few pockets of Tioga fine sandy loam. These sandy deposits are most common in the region just north of the village of Dunedin.

The topography is extremely rough, particularly in some areas which have been designated as steep phase. In these areas the slopes are dissected by several deep valleys including those which carry the headwaters of the Pretty, Mad, Noisy, Pine and Boyne Rivers. The highest and most picturesque part of the Escarpment lies in this area in the Blue Mountain section near Collingwood.

In the main, these soils should be under tree cover. The slopes are highly susceptible to erosion and often too steep for most farm implements. During the pioneer stages of settlement, steep slopes that should have remained in forest were ploughed and cropped and as a result much of the land has been badly gullied. It must be said that most of it has been retired to sod but even under permanent pasture, the steeper fields suffer from erosion. There are, of course, gentler slopes or terraces which are favourable for agriculture.

The farmer in these areas must decide which lands are to be forested, which shall be kept almost continuously in sod, and which may be cultivated. Because of their great scenic value, the use of parts of the areas for parkland should be carefully considered.

Wiarton loam - Edenvale sandy loam

This complex occupies 1,000 acres in the County and is composed wholly of Wiarton loam and Edenvale sandy loam. The Edenvale sandy loam occurs on the sandy knolls which are scattered on top of the till soil. The Wiarton loam is dominant and occupies almost 80 per cent of the complex.

These areas are used for growing spring grains, hay and pasture. Some silage corn is grown but the acreage is usually small. Further information about the individual soils in the complex can be obtained by reading their description in an earlier part of this report.

Tioga loamy sand - Vasey sandy loam

This combination of soils occurs in Essa, Vespra, Oro, Flos, Medonte and Orillia Townships. This complex occupies 65,900 acres or almost 6.5 per cent of the total land area in the County. The complex is composed of the following soil types, 70 per cent Tioga loamy sand, and 20 per cent Vasey

Steep, rolling slopes on the Tioga loamy sand - Vasey sandy loam complex

sandy loam. The remaining 10 per cent consists of small areas of Bookton sandy loam, Simcoe silty clay loam, Granby sandy loam, Sargent gravelly sandy loam and Muck.

The topography is rugged and slopes are steep. Some level areas may occur between or on the tops of the hills, but these are small in size. About one-third of the area is stony and granite and limestone boulders are present. Stones are most numerous on the surface but do occur in lesser amounts through the body of the soil.

Almost 45 per cent of these soil areas have been reforested. Reforestation has been carried out mainly on the steeper slopes and where wind erosion has been severe. Mixed farming is carried on over the remainder of the complex. Cereal grains, hay and pasture are the principal crops grown in the farmed areas. Potatoes and tobacco are the chief cash crops grown but

these are confined to the level areas of well drained sandy soil. Beef cattle are the dominant kind of livestock kept, although there are a few dairy herds. Numbers of sheep and swine are generally small and small flocks of poultry are common on all farms.

The dominant soils of this complex, as has been stated previously, have a low natural fertility, are very susceptible to erosion, and tend to be droughty. With the use of adequate amounts of fertilizer and manure, and management practices which will reduce the loss of soil by erosion, parts of the complex can be made to produce good crops. However, large areas of these soils should be reforested.

Tioga loamy sand - Bondhead loam

This soil complex occurs chiefly in South Simcoe, the largest areas being in Adjala and Tecumseth Townships. Similar areas in the adjoining County of Peel were called Pontypool, which was described as a steeply rolling soil developed from sandy materials. The profile developed from sandy material similar to that of the Tioga but the areas mapped as Pontypool soils also included soils of other types. Therefore, the more informative complex name was used when mapping in Simcoe County.

Gully erosion is severe on the steep slopes of the Tioga loamy sand - Bondhead loam complex

The complex is composed of about 65 per cent Tioga loamy sand and 20 per cent Bondhead loam. The remaining 15 per cent is made up of Schomberg silt loam, Tioga fine sandy loam, Granby sandy loam, Alliston sandy loam, Bookton sandy loam and Muck. The soils of this complex have a rough topography. Short, steep, irregular slopes produce a rugged landscape and is too rough for most farm implements. Erosion is severe on the steep slopes and both wind and water action have taken their toll. A total of 23,300 acres of this complex have been mapped in the County. Of this total, 1,100 acres are steep and have been mapped as a steep phase.

Most of the complex is used for mixed farming. Cereal grains, hay and pasture are the main crops grown. Yields are fair where these crops are grown on the fine sandy loam and silt loam soils. However, most of the complex consists of loamy sands which, in general, produce weedy poor quality stands of hay and pasture and grain yields less than 30 bushels per acre. Yields on these soils can be improved by the use of commercial fertilizer.

Parts of this complex of soils have been reforested and this practice should be continued on the steeper slopes and in areas where erosion is severe.

Rock - Otonabee loam

The Rock - Otonabee loam complex occurs mainly in the Township of Orillia. A total of 2,000 acres have been mapped in the County. Almost 70 per cent of this complex of soils consists of rock. The remainder is Otonabee loam.

The topography is moderately rolling, with a few steep short slopes in some places. The surface of the Otonabee loam is stony. A more detailed description of this soil type has been presented earlier in this report.

This complex has little or no value for agriculture.

AGRICULTURAL METHODS AND MANAGEMENT

Both the climate and the soils of Simcoe County are suited to the growing of a wide variety of crops. General farm crops such as oats, barley, mixed grain, hay and pasture, and specialized crops such as winter wheat, tobacco, tree fruits, potatoes and market garden crops are grown on a large scale. The acreages of field crops grown in 1956, as reported by the Census of Canada, are shown in Table 4.

TABLE 4.

ACREAGES OF FIELD CROPS BY TOWNSHIP (1956 CENSUS)

Township	Crop						
	Hay	Mixed Grains	Oats	Wheat	Silage Corn	Barley	Potatoes
Adjala	4,771	2,039	4,006	3,669	204	243	92
Essa	7,637	4,813	5,674	4,581	451	881	1,652
Flos	8,417	7,276	3,193	2,040	785	598	196
Gwillimbury W.	6,797	2,856	3,859	5,569	430	579	471
Innisfil	9,492	5,271	5,346	3,408	847	523	108
Matchedash	1,561	539	749	21	115	15	11
Medonte	8,644	2,908	4,211	788	554	336	193
Nottawasaga	17,421	10,609	6,844	3,666	508	416	109
Orillia	7,585	2,021	3,436	730	441	124	76
Oro	10,299	5,048	5,391	1,103	1,086	253	486
Sunnidale	6,822	4,480	3,391	3,702	396	638	25
Tay	4,885	1,754	2,164	273	450	35	102
Tecumseth	8,939	6,127	5,701	9,289	741	731	735
Tiny	6,108	4,922	3,631	614	734	244	1,004
Tosorontio	3,026	1,225	2,197	2,432	67	137	187
Vespra	7,151	5,085	2,823	1,597	597	461	282
Total	119,555	66,973	62,616	42,852	8,396	6,214	5,729

According to Table 4, Nottawasaga Township produces the largest acreage of hay. Since a large amount of land in the township is susceptible to erosion, the production of hay does tend to reduce soil loss. The livestock population is high and a comparatively large acreage of mixed grains are grown to provide feed for the livestock. The effect of climate on the growing of winter wheat is demonstrated in Table 4. The largest acreages of this crop are grown in the southern townships where the winters are not so severe as those of the more northerly townships. The low production

record of Matchedash Township is due to the small amount of arable soils. Essa and Tiny Townships produced the largest acreages of potatoes in 1956. By 1960 the total amount of land used for potatoes increased by 2,000 acres. Most of this increase occurred around Alliston where the demand for potatoes improved, due to the building of a processing plant.

The agriculture in the County follows several patterns. In the south, where fine textured soils occur, dairying prevails. The well drained, coarse textured soils in the Alliston and New Lowell districts are used for tobacco and those near Collingwood are used for vegetables and tree fruits. In the rest of the County, mixed farming is common.

The main emphasis is placed on livestock raising as confirmed by the following figures which are — 125,000 cattle, 25,000 sheep, 78,000 pigs and 735,000 chickens. All the farm manure is spread on the land. The quantity of manure used varies greatly, depending on the number of livestock kept. On farms where large quantities of manure are used annually, the soils are rich in humus, have a high fertility level and good physical condition.

SOIL MANAGEMENT

The term soil management refers to the various practices that are used or recommended in the use of soils for the growing of agricultural crops. These practices vary with different soils and with different crops and the farmer learns through experience the kind of practices that give the best results. The reason why many different methods are necessary is that soils may be too infertile, too hilly, or too wet for good farming. Whatever the limitations of the soil of a particular farm may be, the central objective of soil management is to develop and maintain a proper relationship between the plant and the soil in which it grows.

Success in the growing of crops depends, therefore, on the farmer knowing two sets of factors: the requirements of the different plants he can grow and the characteristics of the soil on his farm. Almost any kind of soil can be modified by management to grow any climatically adapted plant if one is willing to go to the trouble. Most successful farmers try to find satisfying combinations of plants that require a minimum of soil change for good growth.

As mentioned in previous pages, most soils consist of an arrangement of definite layers or horizons one above the other, with different colours and other properties. These horizons collectively are called the soil profile. Very young soils or those occurring in poorly drained positions may not have horizons.

In examining soils, the main things to observe are depth, texture, structure, drainage and nutrients.

DEPTH

The soils of Simcoe County, in general, have sufficient depth to provide space for the development of plant roots and the storage of water for normal crop production. Although growing plant roots may extend several feet

into the soil it is safe to assume that a depth of three feet is all that cultivated plants require. This factor becomes serious only in those areas where the soil is thin over bedrock, or where it varies from an inch or two to a depth of one foot. Such soils can provide only a small space for roots and the storage of water. During much of the growing season, therefore, these soils cannot support the plant with the moisture it needs for normal growth. These soils are also too shallow for normal cultivation.

It is estimated that about 8 per cent of Simcoe County consists of shallow soils. These are being used in various ways such as pasture land, cultivated land and woodlots. It is possible that some management practices such as eradication of weeds and fertilization would improve the quality and quantity of forage on these soils, but such land use practices will need to be based on a minimum of capital expenditure because of the low production return that can be expected. The use of these soils as natural grazing land is limited as they do not have sufficient water reserve to carry plants through the months of July and August. Such land quickly becomes weedy and non-productive.

TEXTURE

This term refers to the relative proportion of sand, silt and clay that make up the soil material. The texture in most soils changes from horizon to horizon and extremes are often present when one kind of deposit overlies another. In many of the soil series described, the B horizon contains more clay than the soil above or below it.

The classes of soil texture start with sand, which has only a little silt and clay. Then with increasing amounts of clay, the principal classes are loamy sand, sandy loam, loam, silt loam, clay loam and clay. The classes can be distinguished by squeezing a moist sample between the fingers. The sands are harsh and gritty and the particles scarcely hold together. At the other extreme, clay can be rolled into a smooth, sticky ball.

In general, soils of intermediate texture such as sandy loams, loams and silt loams are easiest to handle. Sands and loamy sands are open and water drains readily through them so they hold rather small quantities of water and are said to be droughty soils. However, their water holding capacity can be increased to some extent by adding liberal amounts of barnyard manure or other forms of organic material. Clays, on the other hand, tend to become hard and stick together in clods unless they are handled carefully.

STRUCTURE

The individual soil particles — sand, silt or clay — group themselves to form various kinds of aggregates which are called structure. The ideal structures are those which are small and soft such as granular or crumb. The next best are the small blocky, nut-like aggregates, between which water and roots can move.

This ability of soil particles to form desirable aggregates is accomplished mainly by organic matter, that is, the dead portions of plant materials. In

cultivated soils where crops are continually being removed, there is little return made to the surface soil of this very important material.

In sandy soils, each grain of sand is often by itself. Clayey soils on the other hand, if deficient in organic matter, become cloddy if ploughed when wet. Hardpans can form in loams and even sands when some cementing material is present to hold the particles together. Wherever they occur within the depth of normal rooting of plants, such hard, cloddy soils must be reworked to make them granular or blocky. It is not enough to break up massive clods. Organic matter must be added, as is done by the addition of barnyard manure or the ploughing down of green manure, in order that fragments will not flow back together into masses when they are wet again.

DRAINAGE

Poorly drained soils are rarely, if ever, productive. It is possible for grass crops to survive and frequently flourish under extremely wet conditions but most cultivated plants cannot remain for long in soils that are saturated with water.

In most cases, the drainage condition of the soil can be determined by its position in the landscape. Often, however, there is little evidence in the surface soil alone of poor drainage beneath. Therefore, it is important that such conditions be identified by an examination of the soil profile. The conditions of soil drainage are indicated fairly reliably by soil colours. Bright, solid colours of brown or yellow suggest fairly good drainage, but in low ground, grey and mottled horizons indicate poor drainage.

A summary of the drainage condition of the soils occuring in Simcoe County is given in the following table.

TABLE 5.

DRAINAGE OF SIMCOE COUNTY SOILS

Drainage Class	Acreage	Per Cent of Total Area
Good	675,000	63.2
Imperfect	169,700	16.2
Poor	155,900	14.6
Very Poor	63,400	6.0

According to Table 5 almost 37 per cent of the land requires drainage of some kind. The remedy that must be applied to conditions of poor drainage must be determined for each individual field. Where open ditches and high crowns may be satisfactory for one field, tile drainage may only be suitable for another. In all cases, the cost of installation and maintenance of a drainage system in relation to the price of the crop produced will need to be considered.

NUTRIENTS

Nutrients or the food that plants derive from the soil cannot be seen. The amount of nutrients can be evaluated from the vigor of growing plants. A measure of nutrients contained in the soil can be obtained accurately on samples in the laboratory. These soil samples can be collected by the individual farmer. Soil sample boxes and the procedure for collecting samples can be obtained from the office of the local Agricultural Representatives at Alliston or Barrie. These are tested free of charge in the laboratory of the Department of Soil Science at the Agricultural College, Guelph.

Some general statements can be made with respect to the nutrient elements that will apply to all soils occurring in this area.

One of the most important conditions required for good plant growth is that there be a balance of plant nutrients in the soil. All plants take at least 12 essential elements from the soil. The most common elements found to be deficient are nitrogen, phosphorus and potassium. These are the elements contained in mixed fertilizers. Calcium and magnesium are included in liming materials and small amounts are usually present in mixed fertilizers. The other elements used in lesser amounts are sulphur, iron, boron, manganese, copper, zinc and molybdenum.

The elements nitrogen, phosphorus and potassium are contained in manure, but since it would take a long time to build up the phosphorus content of a phosphorus deficient soil with manure alone, it is more practical to use chemical fertilizer in addition to organic matter. Deficiencies of nitrogen can be remedied by the growing of leguminous crops such as red clover and alfalfa, particularly if it is ploughed down while a good stand is still remaining. But only a part of the phosphorus and sulphur supplied to crops is derived from this organic matter. The remaining portion is derived from the inorganic fraction of the soil.

The inorganic or mineral fraction makes up the bulk of most soils. It is derived from rocks of various kinds and their degradation products. The

nutrient supplying power of the larger particles — that is, the sand and silt — are quite different from those of the fine particles or clay fraction. Since the nutrient elements are held in the soil mainly by the finer particles, clay textured soils are commonly considered to have a higher nutrient supply than coarser textured soils.

In order to estimate the amounts of fertilizer that it is necessary to apply to achieve a balance of plant nutrients in the soil, several things need to be determined: The nutrients already in the soil, plus those normally added through management practices; the general requirements of the plants to be grown; and the amounts of the nutrients contained in the various fertilizer materials available for use.

This information is being obtained for a great many specific soil types by the research being done on experimental stations and experimental farms and by soil testing laboratories. Differences in climate, soil, and plants mean that the research must be conducted in many locations. For localities in which no research results are available, recommendations are based on results obtained from similar conditions.

SOURCES OF INFORMATION

Results from experimental work carried on by the Ontario Agricultural College, the Horticultural Experiment Station, Vineland, the Tobacco Research Station, Delhi, the Muck Research Station, Bradford, provide information pertinent to the use and management of the soils in this area. Information can be obtained from these places on the uses of fertilizer, the testing of new crops, and the various farm practices that apply to Simcoe County. If information is needed, about the soil itself, this can best be obtained by collecting soil samples, as directed by the Agricultural Representative, and mailed to the Soil Science Department, Ontario Agricultural College, Guelph.

RATINGS OF THE SOILS ACCORDING TO THEIR SUITABILITY FOR DIFFERENT CROPS

Although the soils listed in this report have characteristics by which they differ from one another, many of these characteristics have only a slight effect on the ability of the soil to produce crops. There are, therefore, many soils which should have approximately equal potentials in crop production, and may be grouped together for that purpose.

It is recognized that a poor soil that is well managed will outyield a good soil poorly managed. In the ratings given, no assessment has been made of the effect that a particular kind of management may have on the crop potentials of the soils but it is assumed that the normal farm practices are carried out on all the soils listed. The soils have been listed as types and placed in one of six groups, namely, good cropland, good to fair cropland, fair cropland, fair to poor cropland, poor cropland and unsuitable for crops.

This rating represents an estimate of the crop producing ability of the soil based on the characteristics of the soil itself and the crops growing on

the soil, together with information supplied by farmers and experimental workers. Although the reliability of these groupings has not been verified by crop yield figures for all crops, they have in other counties proven to be reasonably accurate for purposes of farm management and land use planning.

The meanings of the letters used in Table 6 are as follows: G - Good, G-F - Good to Fair, F - Fair, F-P - Fair to Poor, P - Poor.

TABLE 6.

CROP RATINGS FOR SIMCOE COUNTY SOILS

Soil Type or Complex	Wheat	Oats	Mixed Grains	Alfalfa	Red Clover	Timothy	Silage Corn	Potatoes	Pasture
GOOD CROPLAND									
Bondhead loam	G	G	G	G	G	G	G-F	F	G
Harriston loam	G	G	G	G	G	G	G-F	F	G
Harriston silt loam	G	G	G	G	G	G	G-F	F	G
Schomberg silt loam	G	G	G	G	G	G	G-F	F-P	G
Schomberg silty clay loam	G	G	G	G	G	G	G-F	F-P	G
Bennington very fine sandy loam	G	G	G	G-F	G-F	G	G-F	G-F	G-F
Otonabee loam	G	G	G	G	G	G	F	F-P	G
Percy fine sandy loam	G-F	G	G	G-F	G	G	G-F	G	G-F
Harkaway loam	G-F	G-F	G-F	G	G	G	G-F	F-P	G-F
Vincent clay loam	G-F	G	G	G	G	G	F	F-P	G
GOOD TO FAIR CROPLAND									
Smithfield silt loam	F	G	G	F	G-F	G	G-F	F-P	G
Smithfield silty clay loam	F	G	G	F	G-F	G	G-F	F-P	G
Bondhead sandy loam	G-F	G-F	G-F	G-F	G-F	G-F	F	F-P	G
Dundonald fine sandy loam	G-F	G-F	G-F	F	G-F	G-F	F	G-F	G-F
Dundonald sandy loam	G-F	G-F	G-F	F	G-F	G-F	F	F	G-F
Bookton fine sandy loam	G-F	G-F	G-F	F	F	G-F	F	G-F	G-F
Bookton sandy loam	G-F	G-F	G-F	F	F	G-F	F	F	F
Guerin loam	F	G-F	G-F	F	G-F	G-F	F	F-P	G-F
Caledon gravelly loam	F	G-F	G-F	F	F	G-F	F	F	G-F
Burford gravelly loam	F	G-F	G-F	F	F	G-F	F	F-P	G-F
Vasey sandy loam	F	G-F	G-F	F	F	G-F	F	F	F
Lovering silty clay loam	F	G-F	G-F	F-P	F	G-F	F	P	G-F
Lovering clay	F	G-F	G-F	F-P	F	G-F	F	P	G-F
Guerin sandy loam	F	F	F	F	G-F	G-F	F	F-P	G-F
FAIR CROPLAND									
Tioga fine sandy loam	F	F	F	F-P	F-P	F	F	G	F
Wiarton loam	F-P	F	F	F-P	F	G-F	F	P	F
Sargent gravelly sandy loam	F	F	F	F	F	F	F-P	F-P	F
Edenvale sandy loam	F-P	F	F	F-P	F	F	F	F-P	F

TABLE 6. (Cont'd.)

Soil Type or Complex	Wheat	Oats	Mixed Grains	Alfalfa	Red Clover	Timothy	Silage Corn	Potatoes	Pasture
Medonte silty clay loam	—	F	F	F	F	G-F	F	P	F
Medonte silt loam	—	F	F	F	F	G-F	F	P	F
Smithfield silty clay loam - Berrien sandy loam	F	F	F	F-P	F	F	F-P	P	F
Minesing marly silty clay loam	F-P	F	F	P	F	G-F	F	P	F
Minesing marly clay	F-P	F	F	P	F	G-F	F	P	F
Wiarton loam - Edenvale sandy loam	F-P	F	F	F-P	F	F	F	P	F
Tioga sandy loam	F-P	F	F	P	F	F	F-P	G-F	F-P
Simcoe silt loam	F-P	F	F	P	F	F	F	P	F
Simcoe silty clay loam	F-P	F	F	P	F	F	F	P	F
Osprey loam	F-P	F-P	F-P	F	F	F	F-P	P	F
Tioga loamy sand - Bondhead sandy loam	F-P	F	F	F-P	F-P	F	F-P	F-P	F-P
FAIR TO POOR CROPLAND									
Atherley silty clay loam	—	F	F-P	P	F-P	F	F	P	F
Atherley clay	—	F	F-P	P	F-P	F	F-P	P	F
Berrien fine sandy loam	F-P	F-P	F-P	P	F-P	F	F-P	F	F
Alliston fine sandy loam	P	F-P	F-P	P	F-P	F	F-P	F-P	F-P
Simcoe silty clay loam - Berrien sandy loam	F-P	F-P	F-P	P	F-P	F-P	F-P	P	F-P
Parkhill loam - Edenvale sandy loam	P	F-P	F-P	P	F-P	F-P	F-P	P	F-P
Medonte silty clay loam - Rock	—	F-P	P	P	F-P	F-P	F-P	P	F
Tioga loamy sand	P	P	F-P	P	F-P	F-P	F-P	F	F-P
Gwillimbury gravelly sandy loam	P	F-P	F-P	P	F-P	F-P	F-P	P	F-P
Alliston sandy loam	P	F-P	F-P	P	F-P	F-P	P	F-P	F-P
POOR CROPLAND									
Berrien sandy loam	P	P	P	P	F-P	F-P	F-P	F-P	F-P
Wyevale gravelly sandy loam	P	P	P	P	F-P	F-P	P	P	F-P
Tioga loamy sand - Vasey sandy loam	P	P	P	P	F-P	F-P	P	F-P	F-P
Atherley clay - Rock	—	P	P	P	F-P	F-P	F-P	P	F-P
Hendrie gravelly sandy loam	P	P	P	P	P	F-P	P	P	F-P
Wauseon fine sandy loam	P	P	P	P	P	F-P	P	P	F-P
Wauseon sandy loam	P	P	P	P	P	P	P	P	P

Good Cropland

The soil types included in the good cropland give higher average yields and are adaptable to a greater variety of crops than any other soils occurring in the County. They have a texture well suited for most of the crops grown in the area; they contain few stones, are well drained, and have sufficient depth for root development and storage of moisture. They are susceptible to surface erosion by water, a problem that is serious only when the soil is left bare during periods of high water runoff.

Good to Fair Cropland

The soils in the good to fair cropland have certain limitations in crop production that make them less suitable and less productive than the previous group. The Smithfield, Guerin and Lovering soils require artificial drainage. The Caledon and Burford soils have only a moderate water holding capacity and may be stony. Stones are even more troublesome on the Vasey soil and in addition it is susceptible to erosion. Erosion is also a problem on the Bondhead, Dundonald and Bookton soils although they are not as susceptible as the Vasey soil. Satisfactory yields of all crops require the frequent use of commercial fertilizers and barnyard manure. Some application of lime may be necessary on the Vasey soils.

Fair Cropland

The soils included in the fair cropland have greater limitations in crop production as a result of coarse texture, inadequate drainage, susceptibility to erosion, or stoniness. Because of the coarse texture of the Sargent and Tioga soils, the moisture supply is often low so that crops are affected in spite of good management practices. The Wiarton, Edenvale and Simcoe soils require drainage. Under-drainage is also necessary on the Minesing soils although water soon drains through the friable surface soil. Stones interfere with cultivation on the Osprey soil and require constant removal, as they occur in the soil mass as well as at the surface. Both the Osprey and Medonte soils are very susceptible to erosion. In addition, the Medonte soils often have poor structure because of their low organic matter content. The soils in this group can be used for growing general farm crops but such crops will require the use of commercial fertilizers and manure. Although the Tioga soils are not suited to growing general farm crops, they are excellent for growing potatoes, tree fruits, tobacco and market garden crops because of their workability, good drainage and level topography. These high value crops provide sufficient income to furnish the fertilizer and irrigation needed to make their growing a success. Under the common farm management practices, yields of grain and corn can be expected to be lower on these soils than on the soils of the better groups. Therefore, cost of production may eliminate their use for grain and silage corn crops.

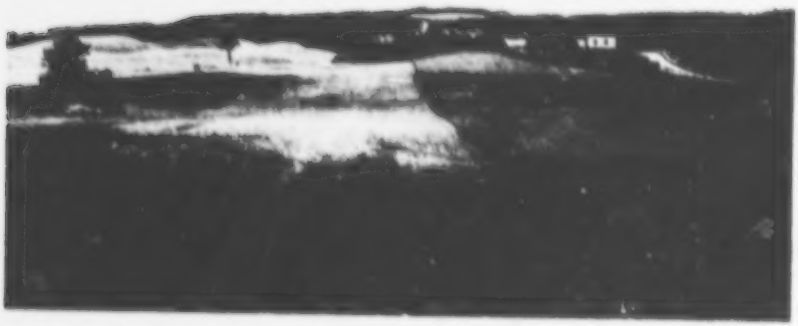
Fair to Poor Cropland

The soils included in the fair to poor cropland have characteristics that limit their suitability to a few crops or to agricultural uses that do not require cultivation. The problems associated with these soils are drainage, shallowness, low fertility, susceptibility to erosion and stoniness. Most of these problems have not been overcome because the cost of improving the soil would exceed the income derived from the crops now grown on these soils. Many of these types can be used as potential hay and pasture lands and it

would probably be economical to apply commercial fertilizer on selected areas. All the soils except the Tioga have some potential use for cereals. However, Tioga loamy sand has a potential for the growing of tobacco which provides sufficient income to pay for the needed soil improvements.

Poor Cropland

The soils included in poor cropland are suitable only for grazing or for forestry. The Tioga loamy sand - Vasey sandy loam complex, which occupies



This scene shows the evidence of sheet erosion on soils with rolling topography

the largest acreage of any of the soils in the group, does include areas which have some potential for growing cereals and tobacco. However, for the most part this complex should be reforested.

In addition to the soils listed in Table 6 which have an agricultural potential, there are soils in the County that have serious hazards that limit use for agricultural purposes such as, excessive stoniness, very steep slopes, wetness or shallowness. However, as the demand for land increases, it is possible that some of these soils could be improved and their agricultural potential increased. These soils are listed in Table 7.

TABLE 7.

SOILS POORLY SUITED FOR PRODUCTION OF CULTIVATED CROPS

Atherley silty clay loam - stony phase
Alliston sandy loam - stony phase
Bondhead sandy loam - stony phase
Bondhead sandy loam - steep phase
Bottom Land
Dunedin clay
Eastport sand
Farmington loam
Gilford loam
Granby fine sandy loam
Granby sandy loam
Granby sandy loam - stony phase
Guerin sandy loam - stony phase
Guerin loam - stony phase
Gwillimbury gravelly sandy loam - stony phase
Harriston loam - steep phase
Kemble clay loam - shallow phase
Lovering silty clay loam - stony phase
Lovering clay - stony phase
Lyons loam
Lyons loam - stony phase
Marsh
Muck
Osprey loam - Dunedin clay
Osprey loam - Dunedin clay - steep phase
Otonabee loam - stony phase
Otonabee loam - steep phase
Parkhill loam
Percy fine sandy loam - stony phase
Rock
Rock - Atherley clay
Rock - Osprey loam
Sargent gravelly sandy loam - steep phase
Schomberg silty clay loam - steep phase
Schomberg silty clay loam - stony phase
Simcoe silty clay loam - stony phase
Tioga loamy sand - stony phase
Tioga loamy sand - eroded phase
Tioga loamy sand - steep phase
Tioga loamy sand - Bondhead sandy loam - steep phase
Wiarton loam - stony phase
Vasey sandy loam - stony phase
Vasey sandy loam - steep phase

APPENDIX

TAXONOMIC CLASSIFICATION, PROFILE DESCRIPTIONS AND ANALYTICAL DATA

In the following pages, profile descriptions of each soils series are presented together with analytical data for one soil profile.

The methods of analysis were as follows:

Mechanical Analyses	— Bouyoucos Hydrometer Method. Soil Science, Vol. 42, 1936, p. 225.
Reaction	— Atkinson, H. J. et al., Contribution 169, Canada Department of Agriculture, 1955.
Base Exchange Capacity and Exchangeable Bases	— Schollenberger Method, Soil Science, 51:1, 1945.
Organic Matter	— Walkley Method, Soil Science, 63:251-264, 1947.
Calcium and Magnesium	— Cheng Methods, Soil Science, 72:449-558, 1951 and Soil Science, 75:37-40, 1953.
Fusion Analysis	— Robinson Method, Soil Science, 59:7-9, 1945.

ALLISTON SERIES

Location: Conc. I, Lot 10, Sunnidale Township

Parent Material: Pale brown to grey, calcareous sand

Classification:

Order	— Podzolic
Great Group	— Podzol
Sub Group	— Gleyed Bisequa Podzol
Family	— Rubicon

Description:

A_1* (Ah)	— 0-1 inch sandy loam; black (10YR2/1); fine crumb structure; very friable consistency; stonefree; pH 5.4
A_2 (Ae)	— 1-3 inches loamy sand; light grey (10YR6/1); single grain; loose; stonefree; pH 5.0
B_2 (Bhfg1)	— 3-10 inches loamy sand; light yellowish brown; (10YR6/4); mottled; single grain; loose; stonefree; pH 5.6
B_3 (Bhfg2)	— 10-31 inches loamy sand; brownish yellow (10YR6/6); very mottled; single grain; loose; stonefree; pH 6.4
B (Btg)	— 31-33 inches sandy loam; yellowish brown (10YR5/4); very mottled; weak medium nuciform; very friable; stonefree; pH7.0
C (C)	— Sand; pale brown (10YR6/3); mottled; single grain; loose; stonefree; calcareous; pH 8.2

ATHERLEY SERIES

Location: Conc. V, Lot 15, Orillia Township

Parent Material: Non-calcareous, varved silt loam and clay

Classification:

Order	— Gleysolic
Great Group	— Dark Grey Gleysolic
Sub Group	— Orthic Dark Grey Gleysolic
Family	— Lincoln

Description:

A_1 (Ah)	— 0-8 inches clay; very dark greyish brown (10YR3/2); medium blocky structure; hard when dry; very plastic when wet; stonefree; pH 6.4
G_1 (Bmg1)	— 8-18 inches clay; grey (10YR5/1); very mottled; mottles brownish yellow (10YR6/6); coarse nuciform; very plastic when wet; very hard when dry; stonefree; pH 6.6
G_2 (Bmg2)	— 18-30 inches clay; grey (10YR6/1); very mottled; mottles brownish yellow (10YR6/6); massive, very hard when dry; very plastic when wet; stonefree; pH 6.6
C (C)	— Silt loam and clay varves; clay greyish brown (10YR5/2); silt loam light grey (10YR7/2); non-calcareous; pH 6.7

*New horizon nomenclature, in brackets, as suggested by the National Soil Survey Committee 1960.

BENNINGTON SERIES

Location: Conc. II, Lot 29, Adjala Township

Parent Material: Non-calcareous fine sandy loam or silt loam underlain by clay till or clay

Classification:

Order — Podzolic
Great Group — Grey-Brown Podzolic
Sub Group — Brunisolic Grey-Brown Podzolic
Family — Honeywood

Description:

A_1 (Ah) — 0-3 inches fine sandy loam; dark grey (10YR4/1); medium crumb structure; very friable consistency; stonefree; pH 6.6

A_{21} (Ae1) — 3-12 inches fine sandy loam; yellowish brown (10YR5/6); medium crumb; very friable; stonefree; pH 6.6

A_{22} (Ae2) — 12-17 inches fine loamy sand; light yellowish brown (10YR6/4); single grain; loose; stonefree; pH 6.0

B_1 (AB) — 17-29 inches fine loamy sand; light brown (7.5YR-6/4); very weak fine nuciform; very friable; stonefree; pH 6.4

B_2 (Bt) — 29-32 inches fine sandy loam; dark brown (7.5YR-4/4); medium nuciform; firm; stonefree; pH 7.2

D (IIC) — Clay; light brown (7.5YR6/4); coarse blocky; very hard when dry; very plastic when wet; stonefree; calcareous; pH 7.9

BERRIEN SERIES

Location: Conc. XI, Lot 9, Sunnidale Township

Parent Material: Non-calcareous sand underlain by calcareous clay or silty clay loam

Classification:

Order — Podzolic
Great Group — Grey-Brown Podzolic
Sub Group — Gleyed Grey-Brown Podzolic
Family — Berrien

Description:

A_1 (Ah) — 0-5 inches sandy loam; very dark brown (10YR2/2); fine crumb structure; very friable consistency stonefree; pH 6.7

A_{21} (Aeg1) — 5-17 inches loamy sand; yellowish brown (10YR5/4); mottled; single grain; loose; stonefree; pH 6.4

A_{22} (Aeg2) — 17-20 inches loamy sand; pale brown (10YR6/3); mottled; single grain; loose; stonefree; pH 6.1

B_2 (Btg) — 20-26 inches sandy loam; yellowish brown (10YR5/6); mottled; very weak medium nuciform; very friable; stonefree; pH 6.7

D (IIC) — Clay; pale brown(10YR6/3); coarse blocky; very hard when dry, plastic when wet; calcareous; pH 7.6

BONDHEAD SERIES

Location: Conc. III, Lot 15, Tecumseth Township

Parent Material: Light grey, calcareous sandy loam or loam till

Classification:

Order	— Podzolic
Great Group	— Grey-Brown Podzolic
Sub Group	— Brunisolic Grey-Brown Podzolic
Family	— Guelph

Description:

A_1 (Ah)	— 0-3 inches loam; very dark greyish brown (10YR3 2); fine granular structure; friable consistency; moderately stony; pH 6.5
A_{21} (Ae1)	— 3-18 inches loam; yellowish brown (10YR5 6); weak fine granular; firm; slightly stony; pH 6.2
A_{22} (Ae2)	— 18-23 inches sandy loam; light grey (10YR7 2); weak fine granular; firm; slightly stony; pH 5.9
B_2 (Bt)	— 23-31 inches loam; dark brown (10YR4 3); medium nuciform; plastic; slightly stony; pH 6.6
C (C)	— Loam till; light grey (10YR7 2); prismatic; hard; moderately stony; calcareous; pH 7.8

BOOKTON SERIES

Location: Conc. XII, Lot 15, Innisfil Township

Parent Material: Non-calcareous sand underlain by calcareous clay or silty clay loam

Classification:

Order	— Podzolic
Great Group	— Grey-Brown Podzolic
Sub Group	— Brunisolic Grey-Brown Podzolic
Family	— Bookton

Description:

A_1 (Ah)	— 0-3 inches sandy loam; dark grey (10YR4 1); fine crumb structure; very friable consistency; stonefree; pH 6.1
A_{21} (Ae1)	— 3-15 inches loamy sand; yellowish brown (10YR5 6); single grain; loose; stonefree; pH 5.5
A_{22} (Ae2)	— 15-25 inches loamy sand; brownish yellow (10YR6 6); single grain; loose; stonefree; pH 6.0
B_2 (Bt)	— 25-28 inches sandy loam; yellowish brown (10YR5 4); very weak medium nuciform; very friable; stonefree; pH 6.5
D (IIC)	— Clay; light brownish grey (10YR6 2); coarse blocky; very hard when dry; plastic when wet; calcareous; pH 7.8

BURFORD SERIES

Location: Conc. II, Lot 3, Adjala Township

Parent Material: Pale brown to grey, calcareous gravel

Classification:

Order	— Podzolic
Great Group	— Grey-Brown Podzolic
Sub Group	— Brunisolic Grey-Brown Podzolic
Family	— Burford

Description:

A_1 (Ah) — 0-3 inches gravelly loam; very dark grey (10YR3/1); medium crumb structure; friable consistency; stonefree; pH 6.6

A_{21} (Ae1) — 3-13 inches gravelly loam; yellowish brown (10YR5/6); weak fine platy; friable, stonefree; pH 6.4

A_{22} (Ae2) — 13-18 inches gravelly loam; light yellowish brown (10YR6/4); weak fine platy; friable; pH 6.0

B_2 (Bt) — 18-25 inches gravelly loam; dark yellowish brown (10YR4/4); medium nuciform; firm, pH 6.7

C (C) — Gravel; light brownish grey (10YR6/2); single grain; loose; calcareous; pH 7.8

CALEDON SERIES

Location: Conc. XI, Lot 2, Nottawasaga Township

Parent Material: Brown, calcareous, gravel

Classification:

Order	— Podzolic
Great Group	— Grey-Brown Podzolic
Sub Group	— Brunisolic Grey-Brown Podzolic
Family	— Burford

Description:

A_1 (Ah) — 0-3 inches gravelly loam; dark greyish brown (10YR-4/2); fine granular structure; friable consistency; slightly stony; pH 6.2

A_{21} (Ae1) — 3-14 inches gravelly sandy loam; yellowish brown (10YR5/8); weak fine platy; friable; slightly stony; pH 5.8

A_{22} (Ae2) — 14-18 inches gravelly sandy loam; light yellowish brown (10YR6/4); weak fine platy; very friable; slightly stony; pH 5.5

B_2 (Bt) — 18-28 inches gravelly loam; dark brown (7.5YR4/2); coarse nuciform; firm; moderately stony; pH 6.8

C (C) — Gravel; brown (10YR5/3); single grain; loose; slightly stony; calcareous; pH 7.8

DUNDONALD SERIES

Location: Conc. VII, Lot 21, Nottawasaga Township

Parent Material: Non-calcareous sand underlain by grey, calcareous loam

Classification:

Order	— Podzolic
Great Group	— Grey-Brown Podzolic
Sub Group	— Brunisolic Grey-Brown Podzolic
Family	— Bookton

Description:

A_1 (Ah) — 0-3 inches sandy loam; dark greyish brown (2.5Y4/2); fine crumb structure; very friable; stonefree; pH 6.2

A_{21} (Ae1) — 3-9 inches sandy loam; yellowish brown (10YR5/4); single grain; loose; stonefree; pH 6.0

A_{22} (Ae2) — 9-15 inches loamy sand; yellowish brown (10YR5/6); single grain; loose; stonefree; pH 5.7

B_2 (Bt) — 15-20 inches sandy loam; brown (10YR5/3); very weak medium nuciform; very friable; stonefree; pH 6.2

D (IIC) — Loam till; grey (10YR6/1); fine prismatic; hard; calcareous; pH 8.0

DUNEDIN SERIES

Location: Conc. XII, Lot 37, Nottawasaga Township

Parent Material: Dark reddish brown, calcareous clay till

Classification:

Order	— Brunisolic
Great Group	— Brown Forest
Sub Group	— Degraded Brown Forest
Family	— Dunedin

Description:

A_1 (Ah) — 0-4 inches clay; dark brown (7.5YR3/2); fine nuciform structure; hard consistency when dry, very plastic when wet, slightly stony; pH 6.7

B_1 (Bm) — 4-7 inches clay; reddish brown (5YR5/3); coarse blocky; very hard when dry, very plastic when wet; slightly stony; pH 6.8

B_2 (Btj) — 7-14 inches clay; reddish brown (5YR4/3); coarse blocky to massive; very hard when dry, very plastic when wet, pH 7.0

C (C) — Clay till; dark reddish brown (5YR3/4); massive; very hard when dry, very plastic when wet; calcareous; pH 7.8

EDENVALE SERIES

Location: Conc. IX, Lot 10, Tiny Township

Parent Material: Non-calcareous sand underlain by grey, calcareous loam or sandy loam till

Classification:

Order	— Podzolic
Great Group	— Grey-Brown Podzolic
Sub Group	— Gleyed Grey-Brown Podzolic
Family	— Berrien

Description:

A_1 (Ah)	— 0-4 inches sandy loam; very dark greyish brown (2.5Y3/2); fine crumb structure; very friable consistency; stonefree; pH 6.4
A_2 (Aeg)	— 4-15 inches loamy sand; olive-yellow (2.5Y6/6); mottled; single grain; loose; stonefree; pH 6.0
B_2 (Btg)	— 15-19 inches sandy loam; light olive-brown (2.5Y5/4); mottled; very weak medium nuciform; very friable; stonefree; pH 6.5
D (IIC)	— Loam till; grey (10YR6 1); fine prismatic; hard; calcareous; pH 8.0

FARMINGTON SERIES

Location: Conc. XII, Lot 19, Nottawasaga Township

Parent Material: Calcareous loam till underlain by limestone bedrock at depths of less than one foot

Classification:

Order	— Brunisolic
Great Group	— Brown Forest
Sub Group	— Orthic Brown Forest
Family	— Farmington

Description:

A_1 (Ah)	— 0-4 inches loam; dark greyish brown (10YR4/2); fine granular structure; friable consistency; slightly stony; pH 7.1
B_2 (Bm)	— 4-8 inches loam; dark yellowish brown (10YR4/4); weak medium nuciform; friable; slightly stony pH 7.4
D (IIC)	— Limestone bedrock

GILFORD SERIES

Location: Conc. III, Lot 22, Essa Township

Parent Material: Pale brown, calcareous gravel

Classification:

Order	— Gleysolic
Great Group	— Dark Grey Gleysolic
Sub Group	— Orthic Dark Grey Gleysolic
Family	— Granby

Description:

A_1 (Ah)	— 0-7 inches gravelly loam; very dark brown (10YR2/2); fine granular structure; friable consistency; few stones; pH 7.2
G (Bmg)	— 7-15 inches gravelly loam; greyish brown (10YR5/2); very mottled; mottles reddish yellow (7.5YR6/6); weak medium nuciform; friable; few stones; pH 7.4
C (C)	— Gravel; pale brown (10YR6/3); single grain; loose; calcareous; pH 8.0

GRANBY SERIES

Location: Conc. VII, Lot 37, Oro Township

Parent Material: Pale brown to grey, calcareous sand

Classification:

Order	— Gleysolic
Great Group	— Dark Grey Gleysolic
Sub Group	— Orthic Dark Grey Gleysolic
Family	— Granby

Description:

A_1 (Ah)	— 0-7 inches sandy loam; black (10YR2/1); medium crumb structure; very friable consistency; stonefree; pH 6.6
G_1 (Bmg1)	— 7-18 inches loamy sand; greyish brown (10YR5/2); very mottled; single grain; loose; stonefree; pH 6.7
G_2 (Bmg2)	— 18-22 inches sand; light brownish grey (10YR6/2); very mottled; single grain; loose; stonefree; pH 7.1
C (Cg)	— Sand; light grey (10YR7/2); very mottled; single grain; loose; stonefree; calcareous; pH 7.9

GUERIN SERIES

Location: Conc. VIII, Lot 7, Orillia Township

Parent Material: Light grey, calcareous loam or sandy loam till

Classification:

Order	— Podzolic
Great Group	— Grey-Brown Podzolic
Sub Group	— Gleyed Grey-Brown Podzolic
Family	— London

Description:

A_1 (Ah)	— 0-4 inches sandy loam; very dark greyish brown (10YR3/2); medium crumb structure; very friable consistency; moderately stony; pH 6.6
A_2 (Aeg)	— 4-12 inches sandy loam; yellowish brown (10YR5/6); mottled; weak fine platy; very friable; moderately stony; pH 6.4
B_2 (Btg)	— 12-19 inches loam; brown (10YR5/3); mottled; weak medium nuciform; friable; moderately stony; pH 6.8
C (C)	— Sandy loam till; light grey (10YR7/2); prismatic; hard; moderately stony; pH 7.8

GWILLIMBURY SERIES

Location: Conc. V, Lot 4, Tosorontio Township

Parent Material: Pale brown, calcareous gravel

Classification:

Order	— Brunisolic
Great Group	— Brown Forest
Sub Group	— Gleyed Brown Forest
Family	— Gwillimbury

Description:

A_1 (Ah)	— 0-6 inches gravelly sandy loam; very dark brown (10YR2/2); fine crumb structure; very friable consistency; calcareous; pH 7.3
B_2 (Bmg)	— 6-13 inches gravelly sandy loam; yellowish brown (10YR5/4); mottled; very weak medium nuciform; very friable; calcareous; pH 7.6
C (C)	— Gravel; pale brown (10YR6/3); single grain; loose; calcareous; pH 8.2

HARKAWAY SERIES

Location: Conc. V, Lot 18, Flos Township

Parent Material: Light yellowish brown, calcareous loam till

Classification:

Order	— Brunisolic
Great Group	— Brown Forest
Sub Group	— Degraded Brown Forest
Family	— Otonabee

Description:

A_1 (Ah)	— 0-5 inches loam; very dark brown (10YR2/2); fine granular structure; friable consistency; moderately stony; pH 7.0
B_1 (Bm)	— 5-9 inches loam; light olive-brown (2.5Y5/4); medium nuciform; friable; moderately stony; pH 7.2
B_2 (Btj)	— 9-14 inches loam; olive-brown (2.5Y4/4); medium nuciform; friable; moderately stony; pH 7.6
C (C)	— Loam till; light yellowish brown (10YR6/4); prismatic; hard; moderately stony; pH 8.0

HARRISTON SERIES

Location: Conc. V, Lot 27, Nottawasaga Township

Parent Material: Pale yellow, calcareous loam or silt loam

Classification:

Order	— Podzolic
Great Group	— Grey-Brown Podzolic
Sub Group	— Brunisolic Grey-Brown Podzolic
Family	— Guelph

Description:

A_1 (Ah)	— 0-4 inches loam; dark greyish brown (2.5Y4/2); medium granular structure; friable consistency; slightly stony; pH 6.8
A_{21} (Ae1)	— 4-12 inches loam; light olive-brown (2.5Y5/6); weak fine platy; friable; stonefree; pH 6.6
A_{22} (Ae2)	— 12-16 inches loam; olive-yellow (2.5Y6/6) weak fine platy; friable; stonefree; pH 6.4
B_2 (Bt)	— 16-25 inches clay loam; olive-brown (2.5Y4/4); medium nuciform; firm; slightly stony; pH 7.0
C (C)	— Loam till; pale yellow (2.5Y7/4); prismatic; hard; calcareous; pH 7.8

HENDRIE SERIES

Location: Conc. III, Lot 14, Flos Township

Parent Material: Grey, non-calcareous gravel

Classification:

Order — Podzolic
Great Group — Podzol
Sub Group — Gleyed Podzol
Family — Rubicon

Description:

A_1 (Ah) — 1-3 inches gravelly sandy loam; very dark greyish brown (10YR3/2); fine crumb structure; very friable consistency; moderately stony; pH 5.7

A_2 (Ae) — 3-5 inches gravelly sandy loam; light grey (10YR7/1); single grain; loose; moderately stony; pH 5.0

B_2 (Bhfg1) — 5-14 inches gravelly sandy loam; yellowish brown (10YR5/8); mottled; very weak medium nuciform; very friable; moderately stony; pH 5.7

B_3 (Bhfg2) — 14-21 inches gravelly sandy loam; light yellowish brown (10YR6/4); mottled; very weak medium nuciform; very friable; moderately stony; pH 6.0

C (C) — Gravel; grey (10YR6/1); single grain; loose; slightly stony; non-calcareous; pH 6.4

KEMBLE SERIES

Location: Conc. X, Lot 42, Nottawasaga Township

Parent Material: Light brown, calcareous clay loam till

Classification:

Order — Brunisolic
Great Group — Brown Forest
Sub Group — Gleyed Brown Forest
Family — Elderslie

Description:

A_1 (Ah) — 0-5 inches clay loam; very dark greyish brown (10YR3/2); fine nuciform structure; friable consistency; slightly stony; pH 7.2

B_2 (Bmg) — 5-13 inches clay loam; brown (7.5YR4/4); mottled; medium nuciform; hard when dry; plastic when wet; slightly stony; pH 7.6

C (C) — Clay loam till; light brown (7.5YR6/4); fragmental; hard when dry; plastic when wet; slightly stony calcareous; pH 8.1

LYONS SERIES

Location: Conc. VI, Lot 12, Oro Township

Parent Material: Light grey, calcareous loam till

Classification:

Order — Gleysolic
Great Group — Dark Grey Gleysolic
Sub Group — Orthic Dark Grey Gleysolic
Family — Lyons

Description:

A_1 (Ah) — 0-6 inches loam; very dark greyish brown (10YR3/2); fine granular structure; friable consistency; moderately stony; pH 7.2

G (Bmg) — 6-20 inches loam; grey (10YR6/1); very mottled; mottles yellowish brown (10YR5/6); massive; hard; moderately stony; pH 7.4

C (Cg) — Loam till; light grey (10YR7/2); mottled, prismatic; hard; moderately stony; pH 7.8

LOVERING SERIES

Location: Conc. VI, Lot 13, Tiny Township

Parent Material: Non-calcareous, varved silt loam and clay

Classification:

Order — Podzolic
Great Group — Grey-Brown Podzolic
Sub Group — Gleyed Grey-Brown Podzolic
Family — Haldimand

Description:

A_1 (Ah) — 0-6 inches silty clay loam; very dark grey (10YR3/1); fine nuciform structure; friable consistency; stonefree; pH 6.1

A_2 (Aeg) — 6-9 inches silty clay loam; light brownish grey (10YR6/2); mottled; weak fine platy; hard when dry, plastic when wet; stonefree; pH 6.1

B_1 (ABg) — 9-14 inches silty clay loam; pale brown (10YR6/3); mottled; massive; hard when dry, plastic when wet; stonefree; pH 6.4

B_2 (Btg1) — 14-19 inches silty clay; greyish brown (10YR5/2); mottled; coarse nuciform; very hard when dry, very plastic when wet; stonefree; pH 6.7

B_3 (Btg2) — 19-25 inches silty clay loam; light brownish grey (10YR6/2); mottled; medium nuciform; hard when dry, plastic when wet; stonefree; pH 6.9

C (C) — Silt loam and clay varves; clay greyish brown (10YR5/2); silt loam light grey (10YR7/2); non-calcareous; pH 7.3

MEDONTE SERIES

Location: Conc. X, Lot 9, Medonte Township

Parent Material: Non-calcareous, varved silt loam and clay

Classification:

Order — Podzolic
Great Group — Grey-Brown Podzolic
Sub Group — Orthic Grey-Brown Podzolic
Family — South Bay

Description:

A_1 (Ah) — 0-2 inches silty clay loam; dark grey (10YR4/1); medium granular structure; friable consistency; stonefree; pH 6.6

A_{21} (Ae1) — 2-5 inches silty clay loam; greyish brown (10YR5/2); weak fine platy; hard when dry, plastic when wet; stonefree; pH 6.2

A_{22} (Ae2) — 5-12 inches silty clay loam; light brownish grey (10YR6/2); weak fine platy; hard when dry, plastic when wet; stonefree; pH 5.9

AB (AB) — 12-18 inches silty clay loam; pale brown (10YR6/3); medium nuciform; hard when dry, plastic when wet; stonefree; pH 6.5

B_2 (Bt1) — 18-25 inches silty clay; yellowish brown (10YR5/6); medium nuciform; very hard when dry, very plastic when wet; stonefree; pH 6.7

B_3 (Bt2) — 25-35 inches silty clay loam; light grey (10YR7/2); coarse nuciform; hard when dry, plastic when wet; stonefree; pH 6.7

C (C) — Silt loam and clay varves; clay greyish brown (10YR5/2); silt loam light grey (10YR7/1); hard when dry, plastic when wet; non-calcareous; pH 7.0

MINESING SERIES

Location: Conc. XI, Lot 3, Vespra Township

Parent Material: Marley clay and silt loam varves

Classification:

Order — Gleysolic
Great Group — Gleysol
Sub Group — Calcareous Gleysol
Family — Minesing

Description:

A_1 (Ahk) — 0-7 inches marly silty clay loam; grey (10YR5/1); fine granular structure; very friable consistency; stonefree; many shells; very calcareous; pH 8.1

C_1 (Ckg1) — 7-18 inches marly silty clay loam; light brownish grey (10YR6/2); very mottled; mottled brownish yellow (10YR6/6); massive; many shells; very calcareous; pH 8.2

C_2 (Ckg2) — Marly silt loam and marly clay; silt loam light grey (10YR7/1); clay greyish brown (10YR5/2); many shells; very calcareous; pH 8.2

OSPREY SERIES

Location: Conc. V, Lot 15, Orillia Township

Parent Material: Coarse, stony, pale brown, calcareous loam till

Classification:

Order	— Brunisolic
Great Group	— Brown Forest
Sub Group	— Degraded Brown Forest
Family	— Osprey

Description:

A_1 (Ah)	— 0-3 inches loam; very dark brown (10YR2/2); medium granular structure; friable consistency; very stony; pH 7.0
B_1 (Bm)	— 3-8 inches loam; dark yellowish brown (10YR4/4); weak medium nuciform; friable; moderately stony; pH 6.8
B_2 (Btj)	— 8-16 inches loam; dark brown (10YR4/3); medium nuciform; friable; very stony; pH 7.4
C (C)	— Loam till; pale brown (10YR6/3); weak prismatic; friable; very stony; calcareous; pH 8.0

OTONABEE SERIES

Location: Conc. V, Lot 7, Orillia Township

Parent Material: Light grey, calcareous, loam till

Classification:

Order	— Brunisolic
Great Group	— Brown Forest
Sub Group	— Degraded Brown Forest
Family	— Otonabee

Description:

A_1 (Ah)	— 0-5 inches loam; very dark brown (10YR2/2); medium granular structure; friable consistency; moderately stony; pH 6.8
B_2 (Btj)	— 5-14 inches loam; dark brown (10YR4/3); weak medium nuciform; firm; moderately stony; calcareous; pH 7.4
C (C)	— Loam till; light grey (10YR7/2); fine prismatic; hard; moderately stony; calcareous; pH 8.2

PARKHILL SERIES

Location: Conc. VII, Lot 4, Sunnidale Township

Parent Material: Light yellowish brown, calcareous loam till

Classification:

Order — Gleysolic
Great Group — Dark Grey Gleysolic
Sub Group — Orthic Dark Grey Gleysolic
Family — Lyons

Description:

A_1 (Ah) — 0-7 inches loam; very dark brown (10YR2/2); medium granular structure, friable consistency; slightly stony; pH 7.3

G (Bmg) — 7-13 inches loam; light brownish grey (2.5Y6/2); very mottled; massive; firm; slightly stony; calcareous; pH 7.6

C (Cg) — Loam till; light yellowish brown (2.5Y6/4); very mottled; prismatic; hard; slightly stony; calcareous; pH 8.0

PERCY SERIES

Location: Conc. X, Lot 41, Nottawasaga Township

Parent Material: Pale brown, calcareous fine loamy sand or fine sandy loam

Classification:

Order — Podzolic
Great Group — Grey-Brown Podzolic
Sub Group — Brunisolic Grey-Brown Podzolic
Family — Honeywood

Description:

A_1 (Ah) — 0-3 inches fine sandy loam; dark greyish brown (10YR4/2); medium crumb structure; very friable consistency; stonefree; pH 6.7

A_{21} (Ae1) — 3-15 inches fine loamy sand; yellowish brown (10YR5/4); very weak fine platy; very friable; stonefree; pH 6.2

A_{22} (Ae2) — 15-20 inches fine loamy sand; light yellowish brown (10YR6/4); very weak fine platy; very friable; stonefree; pH 6.0

B_2 (Bt) — 20-26 inches fine sandy loam; dark yellowish brown (10YR4/4); weak medium nuciform; firm, stonefree; pH 6.8

C (C) — Fine loamy sand; pale brown (10YR6/3); single grain; loose; stonefree; calcareous; pH 8.0

SARGENT SERIES

Location: Conc. XI, Lot 16, Vespra Township

Parent Material: Pale brown, calcareous gravel

Classification:

Order — Brunisolic
Great Group — Brown Forest
Sub Group — Orthic Brown Forest
Family — Sargent

Description:

A_1 (Ah) — 0-5 inches gravelly sandy loam; very dark brown (10YR2/2); fine crumb structure; very friable; pH 7.1

B_2 (Bm) — 5-14 inches gravelly sandy loam; dark yellowish brown (10YR4/4); very weak medium nuciform; very friable; calcareous; pH 7.6

C (C) — Gravel; pale brown (10YR6/3); single grain; loose; calcareous; pH 8.2

SCHOMBERG SERIES

Location: Conc. III, Lot 16, Tecumseth Township

Parent Material: Calcareous varved silt loam and clay

Classification:

Order — Podzolic
Great Group — Grey-Brown Podzolic
Sub Group — Orthic Grey-Brown Podzolic
Family — Huron

Description:

A_1 (Ah) — 0-3 inches silt loam; very dark brown (10YR2/2); medium granular structure; friable consistency; stonefree; pH 6.7

A_2 (Ae) — 3-12 inches silt loam; light yellowish brown (10YR-6/4); weak fine platy; friable; stonefree; pH 6.5

B_1 (AB) — 12-17 inches silt loam; brown (10YR5/3); fine nuciform; firm; stonefree; pH 6.6

B_2 (Bt) — 17-29 inches silty clay loam; dark brown (10YR4/3); medium blocky; hard when dry; plastic when wet; stonefree; pH 7.0

C (C) — Silt loam and clay varves; clay greyish brown (10YR5/2); silt loam light grey (10YR7/2); plastic when wet; hard when dry; stonefree; calcareous; pH 8.1

SIMCOE SERIES

Location: Conc. XII, Lot 23, Tecumseth Township

Parent Material: Calcareous varved silt loam and clay

Classification:

Order	— Gleysolic
Great Group	— Dark Grey Gleysolic
Sub Group	— Orthic Dark Grey Gleysolic
Family	— Brookston

Description:

A_1 (Ah)	— 0-6 inches silt loam; very dark brown (10YR2/2); fine nuciform structure; friable consistency; stonefree; pH 7.2
G_1 (Bmg1)	— 6-13 inches silt loam; greyish brown (10YR5/2); very mottled; medium blocky; firm when dry; plastic when wet; stonefree; pH 7.2
G_2 (Bmg2)	— 13-24 inches silt loam; light brownish grey (10YR-6/2); very mottled; massive; hard when dry; plastic when wet; stonefree; calcareous; pH 7.4
C (C)	— Silt loam and clay varves; clay greyish brown (10YR-5/2); silt loam light grey (10YR7/2); hard when dry; plastic when wet; stonefree; calcareous; pH 8.2

SMITHFIELD SERIES

Location: Conc. XI, Lot 17, Essa Township

Parent Material: Calcareous, varved silt loam and clay

Classification:

Order	— Podzolic
Great Group	— Grey-Brown Podzolic
Sub Group	— Gleyed Grey-Brown Podzolic
Family	— Perth

Description:

A_1 (Ah)	— 0-5 inches silty clay loam; very dark grey (10YR3/1); medium granular structure; friable consistency; stonefree; pH 7.0
A_2 (Aeg)	— 5-8 inches silty clay loam; light yellowish brown (10YR6/4); mottled; weak fine platy; friable; stonefree; pH 6.5
B_2 (Btg)	— 8-19 inches silty clay; brown (10YR5/3); mottled; coarse blocky; hard when dry; plastic when wet; stonefree; calcareous; pH 7.4
C (C)	— Silt loam and clay varves; clay greyish brown (10YR5/2); silt loam light grey (10YR7/2); hard when dry; plastic when wet; stonefree; calcareous; pH 8.2

TIOGA SERIES

Location: Conc. XII, Lot 1, Innisfil Township

Parent Material: Pale brown to grey, calcareous soil

Classification:

Order — Podzolic
Great Group — Podzol
Sub Group — Bisequa Podzol
Family — Tioga

Description:

A_1 (Ah) — 0-1 inch loamy sand; very dark greyish brown (10YR3/2); fine crumb structure; very friable consistency; stonefree; pH 6.0

A_2 (Ae) — 1-2 inches loamy sand; light grey (10YR6/1); single grain; loose; stonefree; pH 4.6

B_2 (Bhf1) — 2-17 inches loamy sand; yellowish brown (10YR5/4); very weak medium nuciform; very friable; stonefree; pH 5.9

B_3 (Bhf2) — 17-35 inches loamy sand; yellowish brown (10YR-5/8); very weak medium nuciform; very friable; stonefree; pH 6.5

B (Bt) — 35-37 inches sandy loam; brown (10YR5/3); weak medium nuciform; very friable; stonefree; pH 7.5

C (C) — Sand; pale brown (10YR6/3); single grain; loose; stonefree; calcareous; pH 8.4

VASEY SERIES

Location: Conc. IV, Lot 20, Vespra Township

Parent Material: Light grey, calcareous sandy loam till

Classification:

Order — Podzolic
Great Group — Grey-Brown Podzolic
Sub Group — Brunisolic Grey-Brown Podzolic
Family — Vasey

Description:

A_1 (Ah) — 0-1 inch sandy loam; very dark greyish brown (10YR3/2); medium crumb structure; very friable consistency; moderately stony; pH 6.2

A_{21} (Ae1) — 1-15 inches sandy loam; light olive-brown (2.5Y5/4); medium nuciform; friable; moderately stony; pH 6.0

A_{22} (Ae2) — 15-33 inches sandy loam; light olive brown 2.5Y5/6); weak medium nuciform; friable; slightly stony; pH 6.4

A_{23} (Aej) — 33-41 inches sandy loam; greyish brown (2.5Y5/2); weak fine platy; very friable; slightly stony; pH 6.6

B_2 (Btj) — 41-45 inches sandy loam; olive-brown (2.5Y4/4); weak medium nuciform; friable; slightly stony pH 6.8

C (C) — Sandy loam till; light brownish grey (2.5Y6/2); weak prismatic; very friable; moderately stony; calcareous; pH 7.6

MECHANICAL AND CHEMICAL ANALYSES OF TIOGA PROFILE

Horizon	Mechanical Analyses				pH	O.M. %	C.E.C. m.e./ 100 gm.	Exchangeable Bases				SiO_2 %	R_2O_3 %	Fe_2O_3 %	Al_2O_3 %	CaO %	MgO %	Na_2O %	K_2O %
	Sand %	Silt %	Clay %	CO_2 %				Ca m.e./ 100 gm.	Mg m.e./ 100 gm.	K m.e./ 100 gm.	Na m.e./ 100 gm.								
A_1	Not Sampled																		
A_2	78.1	20.2	1.7		4.6	1.99	7.63	2.40	0.40	0.08	0.05	77.4	14.6	2.9	11.7	2.0	0.4	2.5	2.2
B_2	80.4	16.9	2.7		5.9	0.47	3.30	1.12	0.24	0.03	0.06	73.0	18.4	3.8	14.6	2.3	0.5	2.7	2.3
B_3	78.9	19.7	1.4		6.5	0.17	1.75	1.12	0.16	0.04	0.06	74.9	16.8	3.6	13.2	2.3	0.5	2.5	2.2
Bt	77.9	12.6	9.5	0.9	7.5	0.19	5.36	7.01	0.55	0.07	0.06	72.4	19.5	4.9	14.6	2.9	0.5	2.6	2.1
C_1	97.7	1.3	1.0	23.6	8.4	0.00	0.71	12.29	0.48	0.03	0.05	65.3	11.5	2.9	8.6	17.2	0.7	2.3	2.0
C_2	97.6	1.0	1.4	24.4	8.5	0.00	0.77	12.41	0.55	0.03	0.07	65.3	13.6	2.9	10.7	15.0	0.9	2.3	2.0

VINCENT SERIES

Location: Conc. XI, Lot 36, Nottawasaga Township

Parent Material: Light brown, calcareous clay loam till

Classification:

Order	— Brunisolic
Great Group	— Brown Forest
Sub Group	— Degraded Brown Forest
Family	— Saugeen

Description:

A_1 (Ah)	— 0-4 inches clay loam; very dark greyish brown (10YR3/2); medium granular structure; friable consistency; slightly stony pH 7.0
B_1 (Bm)	— 4-9 inches clay loam; yellowish brown (10YR5/4); medium nuciform; firm when dry; plastic when wet; slightly stony; pH 7.2
B_2 (Btj)	— 9-19 inches clay loam; brown (7.5YR4/4); firm when dry; plastic when wet; medium nuciform; slightly stony; pH 7.4
C (C)	— Clay loam till; light brown (7.5YR6/4); fragmental; hard when dry; plastic when wet; slightly stony; calcareous; pH 8.0

WAUSEON SERIES

Location: Conc. XII, Lot 8, Medonte Township

Parent Material: Non-calcareous sand underlain by calcareous clay or silty clay loam

Classification:

Order	— Gleysolic
Great Group	— Dark Grey Gleysolic
Sub Group	— Orthic Dark Grey Gleysolic
Family	— Granby

Description:

A_1 (Ah)	— 0-8 inches sandy loam; very dark brown (10YR2/2); fine crumb structure; very friable consistency; stonefree; pH 7.0
G (Bmg)	— 8-19 inches sandy loam; light brownish grey (10YR6/2); single grain; loose; stonefree; pH 7.2
D (IIC)	— Clay; pale brown (10YR6/3); coarse blocky; very hard when dry, plastic when wet; stonefree; calcareous; pH 7.9

WIARTON SERIES

Location: Conc. VI, Lot 33, Nottawasaga Township

Parent Material: Light yellowish brown, calcareous loam till

Classification:

Order	— Brunisolic
Great Group	— Brown Forest
Sub Group	— Gleyed Brown Forest
Family	— Matilda

Description:

A_1 (Ah)	— 0-5 inches loam; very dark brown (10YR2/2); medium granular structure; friable consistency; slightly stony; pH 7.2
B_2 (Bmg)	— 5-12 inches loam; light olive-brown (2.5Y5/4); mottled medium nuciform; firm; slightly stony; calcareous; pH 7.5
C (C)	— Loam till; light yellowish brown (10Y6/4); prismatic; hard; slightly stony; calcareous; pH 8.0

WYEVALE SERIES

Location: Conc. XVI, Lot 8, Tiny Township

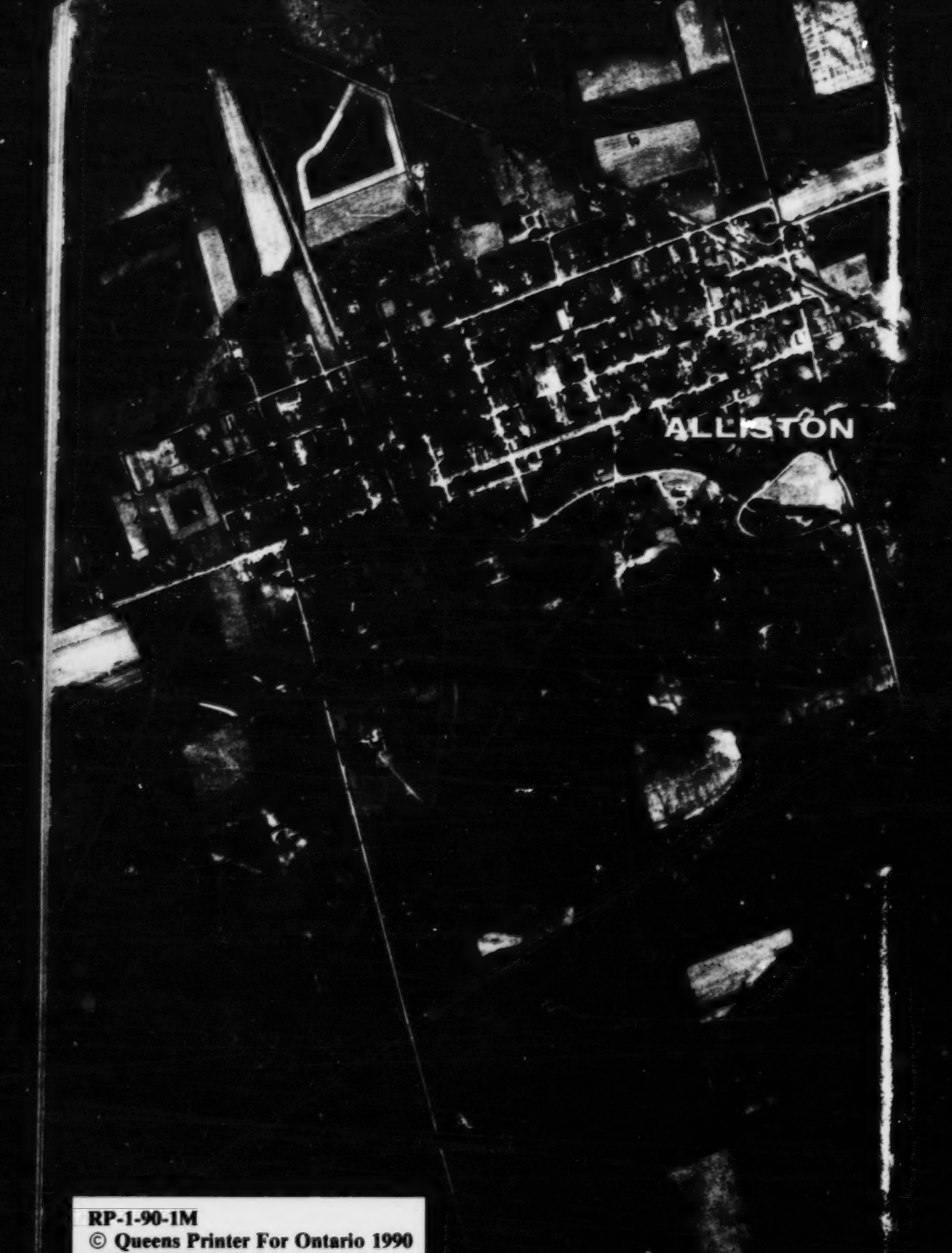
Parent Material: Grey, non-calcareous gravel

Classification:

Order	— Podzolic
Great Group	— Podzol
Sub Group	— Orthic Podzol
Family	— Wendigo

Description:

A_1 (Ah)	— 0-1 inch gravelly sandy loam; very dark greyish brown (10YR3/2); fine crumb structure; very friable consistency; moderately stony pH 5.6
A_2 (Ae)	— 1-2 inches gravelly sandy loam; light grey (10YR7/2); single grain; loose; moderately stony; pH 4.7
B_2 (Bhf1)	— 2-13 inches gravelly sandy loam; yellowish brown (10YR5/4); very weak medium nuciform; very friable; moderately stony; pH 5.8
B_3 (Bhf2)	— 13-19 inches gravelly sandy loam; light yellowish brown (10YR6/4); very weak medium nuciform; very friable; slightly stony; pH 6.3
C (C)	— Gravel; grey (10YR6/1); single grain; loose; slightly stony; non-calcareous; pH 6.5



RP-1-90-1M
© Queens Printer For Ontario 1990